MALLINCAM HD-10 II

[Version 1.0] Michael Burns Rock Mallin



[Mallincam HD-10 II User Manual]

This document will quickly introduce you to the wonders of the Mallincam HD-10 II Camera. We will include instructions on how to install the Software and Drivers and how connect the HD-10 II 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 II Camera so that you can image the skies and share your passion with others.

Revision History

Version	Date	Revision Description
1.0	03/17/2020	Template Creation

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1. Introduction

The Mallincam HD-10 II is a world's first ever produced true HD High Definition live video camera for astronomical work which includes a built-in focuser and whose output is HDMI. The new MallinCam HD-10 II 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 HD-10 II will even do both, you can control the camera from a computer and connect a HDMI monitor to the camera and both outputs will display what the camera in imaging. This is a great tool for Outreach; the MallinCam HD-10 II is a easy to operate true versatile astronomical video camera.

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 bright deep sky objects, Planetary views, Lunar views, Solar observation (when used with proper solar filter). All with spectacular results when observed on a HDMI monitor (user supplied) of any size. Ready to impress your audience when viewing astronomical features on a large HD monitor in 16:9 resolution at 1080P, then this camera is for you.

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 into 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 II 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 II adopts an innovative FPGA dual-core processor, FPGA1 high-definition image quality processor and FPGA2 image output controller, to ensure live high-speed high-quality images.

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

The Contents of the HD-10 II - 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 II CMOS(1) 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



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

Optional Components

- > Mallincam 1.25" 0.5 x Focal Reducer w/25mm extension
- > Mallincam 1.25" IR Blocking Filter

➢ Mallincam 1.25" Polarizing Filter







2. Installing Driver and Software

System Requirements

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

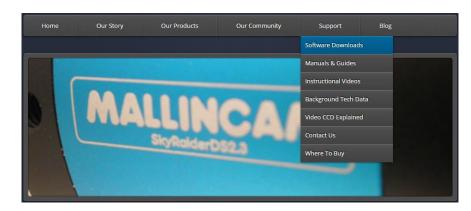
Performance is not guaranteed if the following specification cannot be reached.

- 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 II Driver.

MALLINCAM HD-10 II Software



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



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

3. The Mallincam HD-10 II with a HDMI Monitor

Connecting the HD-10 II to your HDMI Monitor

First make sure you have the following pieces of equipment:

- Mallincam HD-10 II 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 II 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 II. (You may need to remove the blue protection screen covering the CMOS sensor prior to attaching nosepiece).

Insert the Mallincam HD-10 II 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 II. A **Red LED** power indicator will turn on.



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





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



Power on the Monitor.

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Note

Power on the HD-10 II 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 II camera.

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 II 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 II's image control Icons will appear.

Moving the mouse **away from the sides** of the monitor will remove the Icons from the screen.



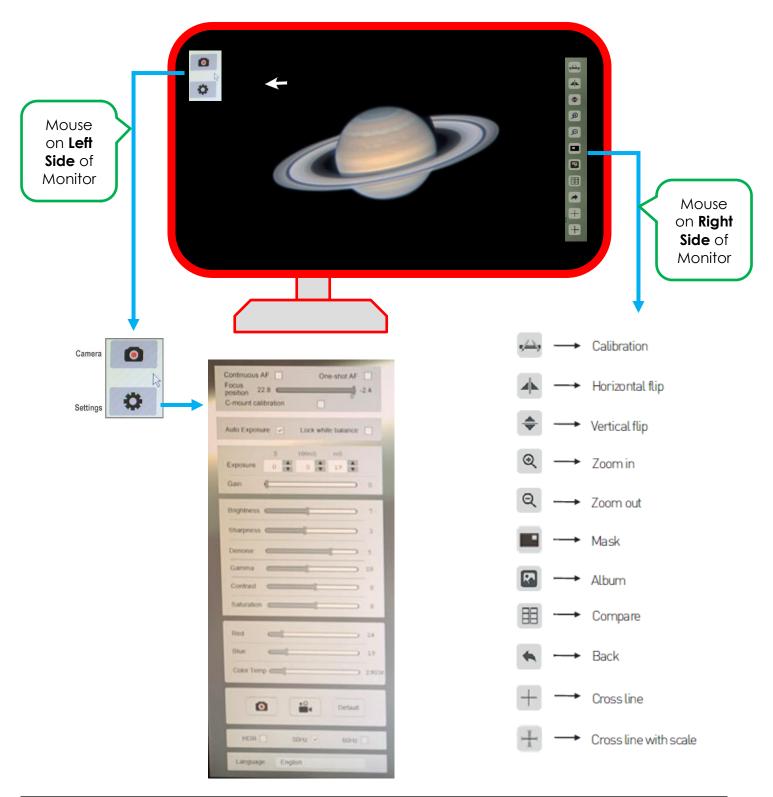






HD-10 II Control Icons

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 II camera using just a HDMI Monitor.



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 II 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 II Camera will revert back to live view.

Settings Icon

Clicking on this Icon will tell the Mallincam HD-10 II 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 and/or manually adjust auto focus
- Turn on or off auto exposure
- Set exposure
- Set Gain, Gamma, Contrast, and Saturation
- Set the Brightness, Sharpness, and Denoise values
- Adjust colors
- Take a Snapshot
- Take a Video
- Choose anti-flicker frequency
- Change default Language

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 **leftside** of the HDMI Monitor's Window will bring back the **Icons** and **Settings Control Window**.

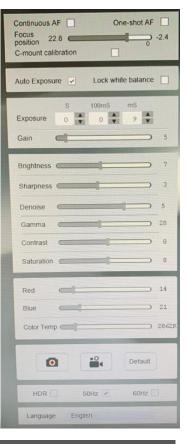


Image Action Window

Calibration	Click on this Icon to start a calibration process of matching the number of pixels on screen to practical measurement units.			
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.	5 <u>~~</u> 7	\rightarrow	Calibration
Elip Vortically	Click on this loop to Move the top of the		\rightarrow	Horizontal flip
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	\$	→	Vertical flip
	window.	€	\rightarrow	Zoomin
Zoom in	Click on this Icon to zoom in or click and hold to zoom in continuously until maximum	Q		Zoom out
	is reached. Zoom Range from 1x to 10x .			Mask
Zoom out	Click on this Icon to zoom out or click and hold to zoom out continuously until	R		Album
	minimum is reached. Zoom range from 10x to 1x .		\rightarrow	Compare
Mask	Clic k on this Icon and the mouse cursor will change to a hand . Now Click-Hold-and-	*	→	Cancel
	Drag the hand-cursor to create a box on the screen. Only the portion of the image	+	→	Crossline
	inside the box will be visible, the remainder will be blacked-out. You can now place your hand cursor inside the box and Click-	\pm	→	Cross line with scale
	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.			

Album 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 II camera.

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 II 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 half of the Image Window, and the current live image on the right half of the Image Window. You can Left-Click-Holdand 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.

- Back Click on this Icon take you back a screen choice. Can act like a cancel.
- Crossline Click on this Icon to place a number of Horizontal and/or Vertical lines on the screen. You can also select the color of the lines displayed. Set Horizontal and Vertical to 0 to remove the lines.

Ruler Clicking on this Icon will display the current pixel scale chosen with the Calibration.



4. Imaging with the HDMI Monitor Work-Flow

You have attached the Mallincam HD-10 II 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). Now you are now ready to image.

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

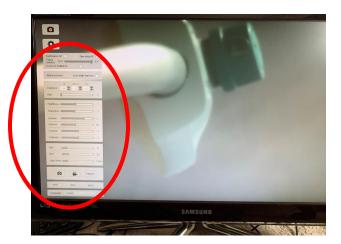
Step 1

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 II remembers if this window was 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 We will now tweak the **focus**. You may already have a good focus on your object by adjusting the telescope's focuser, but you can have the HD-10 II **automatically** fine tune the focus for you (**One—shot** AF), or you can **manual** drag the focus bar to obtain your best focus.

Next, 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.

Continuous AF	One-shot AF
Focus 22.8	-2.4
C-mount calibration	

Auto Exposi	ure 🗹	Lock wh	ite balance	2
11	S	100mS	mS	
Exposure	0	0	9	
Gain				5

You can select an exposure range from 1 micro-seconds all the way to 10 seconds

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

Step 4

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 five commands will allow us to tweak the image further by adjusting the **Brightness**, **Sharpness**, **Denoise**, **Gamma**, **Contrast**, and **Saturation** values on the HD-10 II.

Step 5

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

Brightness		1	 7
Sharpness	_		3
Denoise		1	5
Gamma	_	-	28
Contrast	-	in the second	8
Saturation	_	-	 8

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 of an 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.
- 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.



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.

Red	-	4	 14
Blue	-	-1	 21
Color Temp		-	2862K



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 II will reset all the controls back to their defaults.

Default



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.

HDR	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.



HDR (High Dynamic Range) allows the HD-10 II to extend the dynamic range, making it easier to see both dimmer and brighter aspects of the image. On some planetary detail it may improve the image quality.

- To save a JPEG snapshot of whatever image is currently on your monitor, just **click** on the 0 Camera Icon. The Mallincam HD-10 II 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.
- 2 To Start a .avi (VID001.AVI) recording of the images being captured on HD-10 II, 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.



saved snapshot or video file.

You can use the **Album Icon** (from the right side of the screen), to view or delete the

5. The Mallincam HD-10 II with a Computer

Connecting the HD-10 II to your Computer

First make sure you have the following pieces of equipment:

- Mallincam HD-10 II 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 **MallinCam2.1 Setup Software** from the provided USB Stick (or the latest download from Mallincam.net) into folder of your choice on your computer.

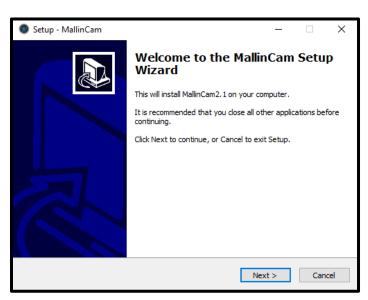


Double-Click on the **Mallincam2.1 Setup** to start the installation process.

MallinCam2.1 Setup



The following window will appear:



>

Click on Next to continue the installation process.

An Acceptance Window will now appear.

Setup - MallinCam	_		×
Select Destination Location Where should MallinCam be installed?		¢	
Setup will install MallinCam into the following folder.			
To continue, click Next. If you would like to select a different folder, clic	ck Brov	vse.	
C:\Program Files\MallinCam	Bro	wse	
At least 3.2 MB of free disk space is required.			
< Back Next >		Car	ncel

Either **accept** the file location for the **Mallincam2.1 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 Components window.

Setup - MallinCam	_		Х
Select Components Which components should be installed?			
Select the components you want to install; clear the components y install. Click Next when you are ready to continue.	vou do not	want to	
Full installation		~	
✓ MallinCam2.1 ✓ Camera Driver Current selection requires at least 2.6 MB of disk space.			
< Back Ne	ext >	Can	cel



Make sure both the Mallincam2.1 and Camera Driver are checked.

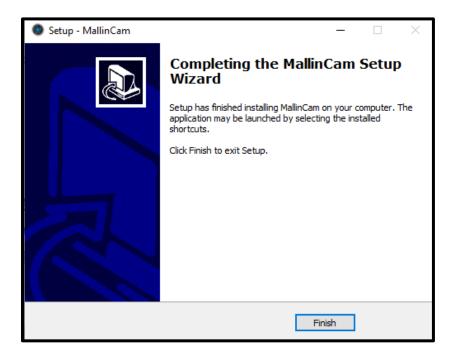


Click on Next to accept the Components.

The Mallincam2.1 and Drivers will be installed on your computer. Then the Completing the MallinCam Setup Window will pop-up.



Click on **Finish** to acknowledge the installation.



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



Starting on the HD-10 II on the Computer



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

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

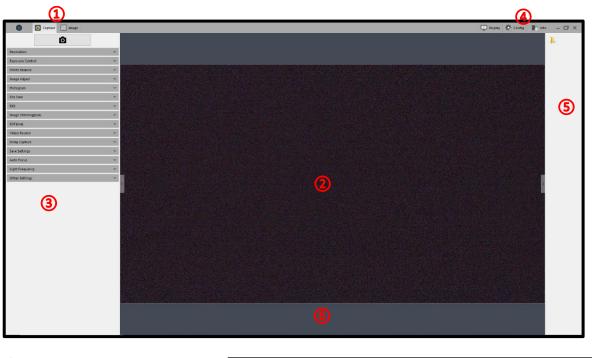
>

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



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

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



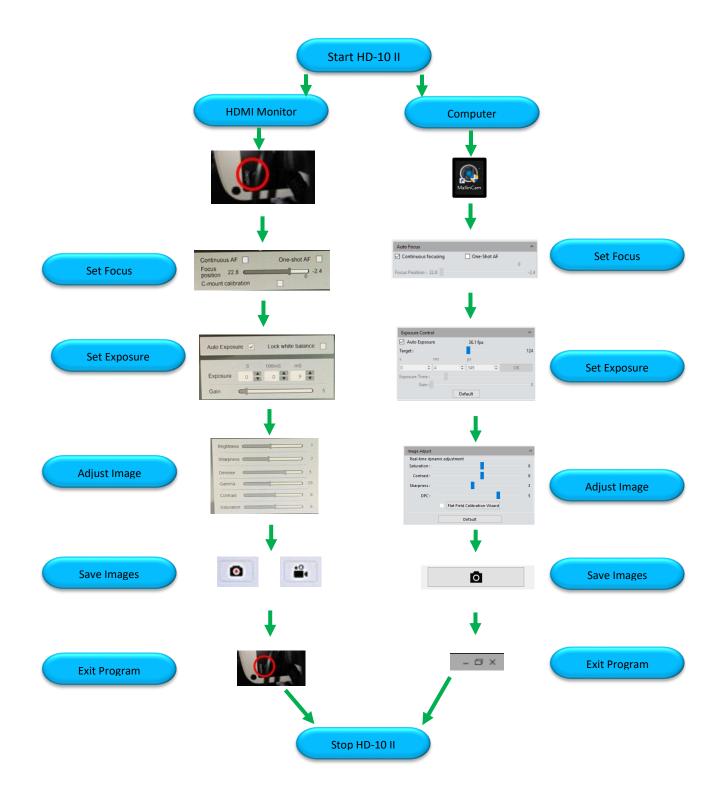
- (1) Status Bar
- 2 Display Window.
- **3** Feature Tabs.
- (4) Image Bar.
- 5 Image Tray.
- (6) Data Bar

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 II Quick Setup and Pictorial Work-Flow

A typical workflow when using the HD-10 II.



Detailed Work-Flow Procedures on a Computer

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

Once you have the HD-10 II's **Mallincam Software** up and running, you should see an image of whatever the HD-10 II camera is looking at (at whatever exposure setting the software is set at).

At the Top of the Window on the Status Bar, ensure that the Capture tab is selected.



Step 1

Exposure

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 Mallincam Software provides a simple process of selecting and deselecting the autofocus along with the ability to manually adjust the exposure settings.

Exposu	re Control			^
🖂 Auto	Exposure	36.1 fps		
Target :				124
s	ms	μs		
0	\$ 4	\$ 549	 OK	
Exposure	e Time : Gain :			
	Gain :	Default		0

The Mallincam HD-10 II has an exposure range from 1 ms to 10 seconds

To activate the **Auto-Exposure**, just check the box next to its name. This will gray out the manual adjustments, **Exposure Time** slider and the **gain** slider.

You can set a preferred value for the exposure setting using the **Target** slider located under the **Auto Exposure** checkbox.



You have two ways to manually adjust the exposure (make sure **Auto Exposure** is unchecked):

1. By using the Manual entry values.

You can enter in a value in the **s** and **ms** boxes or use the **up** and **down** arrows adjacent to the box to increase or decrease the value in the box.



Click on the **OK** button accept the new exposure value.



The HD-10 II will not change the exposure value until you give it permission by clicking on the **OK** button.

2. By using the **Exposure Time** slider.

Exposure Time :

Left-click-hold and drag the slider to adjust the exposure time. You will notice the exposure time value in the manual entry boxes for the time change in real time along with the real time response from the camera.

Step 2

Focus

You most likely have your telescope focused on an object, but we have all experience the image shake as we try to adjust the telescope's focus in real time, The HD-10 II's unique ability to finetune the focus by adjusting its sensor position can assist you in achieving perfect focus without having to touch the telescope's focuser.

Select the **Auto-Focus** tab in the **Feature Tabs** to open it up. You have 3 options:

Auto Focus		^
Continuous focusing	One-Shot AF	
		0
Focus Position : 22.8		-2.4

- 1. Check **Continuous focusing** to have the camera continuously monitor the object in the green box (which you can move by **left-click-hold and drag**)
- 2. Check **One-Shot AF** which will focus the camera on whatever is located in the green box.
- 3. Uncheck both choices, and the **Focus Position** slider becomes active. Now you can manually adjust the focus of the camera by sliding the bar to the left and right.

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.

Gain : 20



Clicking on the **Default** button will reset the exposure values, activate **Auto Exposure** and adjust the **Gain** to match the exposure.

White Balance

Different planetary objects in combinations with different sky conditions, may throw off the colour balance of the HD-10 II. We can bring everything back to normal by using the **White Balance** control which is located in the **Feature Tab**.

White Balance	^
Lock White Balance	Gray
Red :	7.0
Green :	0.0
Blue :	9.5
Defaul	t

The default setting of the White Balance is **Auto-White Balance**, but you can manually adjust the ratio of the two individual components of **Red** and **Blue** (Green is fixed at 0.0). To adjust the values, **checkmark** the **Lock White Balance** and then use the sliders to adjust the color ratio to the required values. Do not uncheck the Lock White Balance as this will again activate **Auto White Balance**.



Step 3

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



Check-marking this option will convert the color image to a black and white image.

Step 4

Saturation, Contrast, Sharpness, and DPC

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

Image Adjust		^
Real-time dyna	imic adjustment	
Saturation :		8
Contrast : =		8
Sharpness :	- I	3
DPC :		5
	Flat Field Calibration Wizard	
	Default	

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

- **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.
- Sharpness Sharpness can be defined as edge contrast, that is, the contrast along edges in an 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.
- **DPC** This represents for **D**ead **P**ixel **C**orrection and is used to detect and remove dead pixels from the active image.

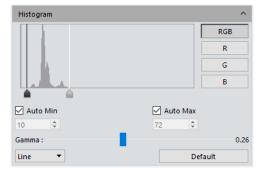
Flat Field Calibration Wizard

This control will start a process that will help eliminate any optical spots caused by dust and particles on the optical path (from lenses to mirrors on the telescope). This Wizard will walk you through taking a couple of images so it can detect and remove the imperfections making a more uniform image.

Histogram

Step 5

Hiding in the **Image Adjust Tab** is a useful tool 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 color 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 **Image Adjust Tab**. Don't be afraid to experiment with the settings.

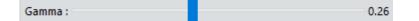
The Histogram allows you to manually or automatically adjust the **image levels** of all color components the image that the HD-10 II camera is producing. You can control each individual channel (Red, Green, and Blue) are the combined color channel.

You have manual control of the image levels when the Auto checkboxes are un-checked.

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

The **Histogram** provides a pictorial view of the image intensities from dark to bright. In a dark image, the graph will be more towards the left, and in a bright image will have the 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).

Gamma - Each pixel in an image has brightness level, called luminance. This value is between 0 to 0.63, where 0 means complete darkness (black), and 0.63 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.



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.

>

Step 6

Located above the **Image Adjust** Tab is the **take-a-snapshot** icon. Just **Click** this icon and the **Mallincam Software** will capture the image and display a thumbnail of that image in the **Image Tray**.

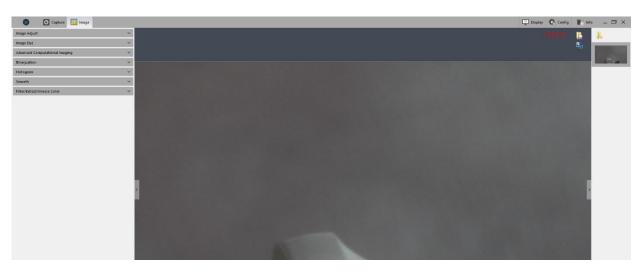


Capture Capture		🖵 Display 🙋 Config 📗 Info 😐 🗇
Resolution	•	
xposure Control	×	
/hite Balance		
nage Adjust	·	
istogram	 	
lle Save		
01		
sage Stitching(Live)	×	
DF(Live)		
ideo Record	×	
elay Capture	 Image: A second se Second second sec Second second sec second second sec	
ave Settings	×	
Auto Focus		
Light Frequency		



Click on this Thumbnail to move into the Image component of the Mallincam Software.

From here we can tweak the image before saving it (but most of us will use another image software later after we have finished with the session).

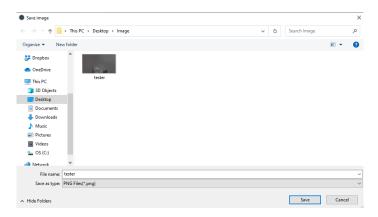


On the upper right side of the image window are 2 icons (Image crop and Save Image as)



Since we want to save the image, Click on the Save Image as icon:

This will open up the **Save Image Window** where you can choose a directory location on your computer, a file name for the image, and the format you would like the image saved in (**BMP**, **JPEG**, **TIFF**, **PNG**).



Capture and Save 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 II is looking at.



Step 7

The first thing we should do is select a location to save the video

In the Capture Tab select the File Save Tab

 ∪ Use Dialog ● Use File Name File Name : TS + yyyymmddHHMMSS ▼ Format : _ JPG ✓ TIF PNG DICOM Path : C:/Users/Michael/Desktop/Image Browse 	File Save			^
File Name : TS + yyyymmddHHMMSS Format : JPG ✓ TIF PNG DICOM	🔘 Use Dialog			
Format :] JPG I TIF PNG DICOM	Use File Name			
	File Name : TS	+ yyyymmdd	HHMMSS	•
Path : C:/Users/Michael/Desktop/Image Browse	Format : 🔲 JPG	TIF PNG		
	Path : C:/Users/Mi	chael/Desktop/Image	E	Browse

Then use the **Browse** button to select the location you would like your Videos saved.



Video Record					^
	Encoder :	Full frame(No compressio	•		
Auto Stop					
O Total Frame :		10	÷		
O Total Time(s):		10	÷		
Delay Time :		0	÷	min	7
Save to :					
Hard Disk					
O RAM					
Video Recor	d	Default			



You have the option of compressing the video, but we don't want to do that, so ensure that **Encoder:** is selected as **Full frame (No compression**).



You have many Start/Stop choices:

- 1. You **Start** with a **Click** of the **Video Record** button and you **Stop** the recording by again hitting the **Video Record** button (whose name has changes to **Stop Video**).
- 2. Select **Auto Stop**, where you can determine ahead of time either the total number of frames you would like recorded, or the duration you would like the length of the video to be.



You also have one other option that you can select with the **Auto Stop** technique, **Delay Timer**.

If you **check-marked** the **Delay Timer**, then you can enter time delay before the **Mallincam Software** executes your **Auto Stop** settings.

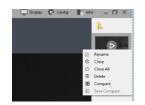


Don't use **Delay Time** with technique 1, as it will crash the program.

No matter which technique you used, a thumbnail of the Video will appear in the **Image Tray** (the video is already saved on your computer).



You can watch the Video by **double-clicking** on its thumbnail, or if you **Right Click** on the Thumbnail you will have the option of deleting it and/or renaming the Video.



Let's rename the Video to "Test Video", so **Right Click** on the Thumbnail, and select **Rename**. A Window will open-up that allows you to enter a name for the Video (you can use this to rename the video as well).

Rename	×
Name : Test Video OK	



Exit the Software

Your evening session is over, and it is now time to power down both the **Mallincam Software** and the **HD-10 II** camera.

Click on the X in the upper right side of the Mallincam Software Window.



The Software will ask you for verification, Select Yes to shut down the Mallincam Software.

Warning	×
Are you sure to close the windo	w?

Now to power-down the **HD-10 II**, press the **ON/OFF** button on the back of the camera. The Blue light will turn off when the Mallincam **HD-10 II** is turned off.

6. Mallincam Software Commands

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

HD-10 II Status Bar (Computer)

The top of the HD-10 II Control Software window contains a Status Bar.

Capture 🔣 Image

The Status Bar will allow you to:

- View what the HD-10 II camera is imaging.
- Examine and adjust a saved image.
- Zoom in/out and flip and rotate the Image Window.
- Rearrange the control tabs on both the Capture Tabs and the Image Tabs.
- Select Display Language.
- Provide information about the Software Version.
- Minimize and resize the software window.
- Shut down the HD-10 II Control Software.

> Action Tabs

٢	Capture	🔣 Image	
			1

The Mallincam HD-10 II Control Software provide you with two major **Action Tabs**: **Capture**, and **Image**.

- The **Capture Tab** displays what the HD-10 II is currently imaging in real time and allows you to adjust the image and exposure values, save still shots or save video sequences.
- The Image Tab allows you to adjust a saved image and check its properties or rename it.



The **Capture Tab** is the main Tab used for viewing your live images from the HD-10 II camera.

It provides a prominent **Snapshot** button, along with various tabs that allow you to adjust all the camera properties.

Each tab can be expanded by clicking on the down arrow. This will display the controls for that tab.

Ō	
Resolution	~
Exposure Control	~
White Balance	~
Image Adjust	~
Histogram	~
File Save	~
ROI	~
Image Stitching(Live)	~
EDF(Live)	~
Video Record	~
Delay Capture	~
Save Settings	~
Auto Focus	~
Light Frequency	~
Other Settings	~



Snapshot Icon

The Snapshot icon allows you to take an immediate snapshot of what the Mallincam HD-10 II camera is displaying. The image will be saved in the location designated in the File Save Tab (see below). A thumbnail of the image will appear in the Image Tray on the right side of the Window.

Resolution Tab Resolution ^

The Resolution Tab allows you to adjust the resolution of the camera

Feature	Title	Usage
Resolution ^		This drop-down selector allows you to choose from either using a compressed or a non-compressed image format.
Resolution : 1920x1080 uncompress 🔻	Live Image Resolution	We recommend the uncompress selection
		The HD-10 II currently only provides a 1920 x 1080 resolution.

Exposure Control Tab Exposure Control

It is here in the **Exposure Control Tab** that you have complete control of the exposure process. You can have the HD-10 II 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 Time** bar. This tab also allows you to adjust the **Gain** of the camera.

Feature	Title	Usage
Auto Exposure	Auto Exposure	 When control is checked, the HD-10 II camera will attempt to provide the best exposure for the image. The control will also adjust the gain to help provide the best gain setting. Once unchecked, the settings will remain, but you have manual control to adjust them to your liking. To the right of the Auto exposure control is the current frames per second capture rate of the camera.
Target :	Target	When the Auto Exposure control is active, then so is the Target Slider. This slider allows you to give an exposure time indicator on a scale from 0 to 15 that the Auto Exposure should aim for. The higher the Target number, the longer the Auto Exposure can push the camera. Use Left-Click-Hold and Drag to move the slider.
s ms µs 0 2 9 3 0 0 ОК	Manual Exposure Setting	This control allows you to either manual enter in the exposure time the s or the ms box or use the up and down arrows adjacent to the box to adjust the time. The exposure will not change until you click on the OK button to the right of the time boxes. The HD-10 II has a range of exposure times from 0 ms to 10 s

Exposure Control				1
Auto Exposure	5.7 fps			
Target :				
s ms	μs			
0 💠 9	0	A V	ОК	
Exposure Time :				
Gain :				
	Default			

Feature	Title	Usage
Exposure Time :	Exposure Time	 This control allows you to use a slider to change the exposure. This control updates the exposure in real time. The Slider will provide an exposure range from 2 ms to 10 s. The exposure time will be displayed in the above time boxes.
Gain :	Gain	Gain is a setting that controls the amplification of the signal from the camera sensor. It should be noted that this amplifies the whole signal, including any associated background noise. Use Left-Click-Hold and Drag to move the slider to the right to increase the gain (brighten the image) and to the left to decrease the gain (darken the image).
Default	Default	This control resets the HD-10 II exposure and gain settings back to the factor defaults The Factory default is Auto Exposure , so both the time and the gain will be automatically adjusted to the current conditions.

White Balance Tab White Balance

It is here in the **White Balance Tab** that you have complete control of the individual color components of the image. **White Balance** is the process of removing unrealistic color casts, so that objects which are white in reality are rendered white in your image.

White Ba	lance		^
	🗹 Lock White Balance	Gray	
Red :			8.0
Green :			0.0
Blue :			12.0
	Default		

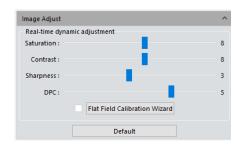
This tab also provides the opportunity to display the image in Black and White (monochrome).

Feature	Title	Usage
		This control allows you to either use automatic White Balance or to manually control the White Balance.
C Lock White Balance	Lock White Balance	When unchecked the camera is using automatic White Balance .
		When checked you have controls to the Red and Blue sliders to adjust the image balance on the screen.

Feature	Title	Usage
Gray	Gray	Gray is the control that displays the image in Black and White. When checked the image is in Black and White. When unchecked the image is displayed in color.
Red : 8.0 Green : 0.0 Blue : 12.0	Color Control	When the Lock White Balance is checked, the sliders become active. By moving the appropriate color slider to the right, you increase the amount of that color in the image, likewise by moving the slider to the left, your decrease the amount of that color component in the image. The ranges for the colors go from 0 to 48 .
Default	Default	This control resets the HD-10 II White Balance back to factory defaults which is automatic with a color image.

Image Adjust Tab Image Adjust

It is here in the **Image Adjust Tab** that you have complete control of the real time image adjustment available for the camera. This tab allows you to adjust the **Saturation**, **Contrast**, **Sharpness**, **DPC** (**D**ead **P**ixel **C**orrection) and **Flat Fielding**.



Feature	Title	Usage
Saturation : 8	Saturation	Saturation is similar to contrast, however instead of increasing the separation between shadows and highlights, it increases the separation between colors.Moving the slider to the right increases the saturation (makes the color more vibrant), while moving the slider to the left decreases the saturation (makes the image more
		monochromatic). The saturation has a range from 0 to 15 .

Feature	Title	Usage
Contrast: 8	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. Moving the slider to the right increases the contrast (makes the image brighter), while moving the slider to the left decreases the contrast (makes the image darker). The contrast has a range from 0 to 15.
Sharpness : 3	Sharpness	Sharpness can be defined as edge contrast, that is, the contrast along edges in an 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. Moving the slider to the right increases the sharpness (makes the image sharper), while moving the slider to the left decreases the sharpness (makes the image smoother). The range goes from 0 to 7.
DPC : 5	DPC	 Dead Pixel Correction is used to detect and remove dead pixels from the active image. Moving the slider to the right increases the aggressiveness of the DPC, while moving the slider to the left decreases the aggressiveness. A higher DPC value can help remove amp glow on long exposures (but can remove some fainter stars). The range goes from 0 to 7.
Flat Field Calibration Wizard	Flat Field	 Flat Fielding is a process that help remove imperfection in the light path to the sensor (such as dust particles on the lens). Clicking the wizard button will prompt you to take a blank image of a white area (white t-shirt over telescope), then image same area without t-shirt. Check to activate, uncheck to deactivate.
Default	Default	This control resets the Real Time Dynamic adjustments back to factory defaults.

Histogram Tab Histogram

It is here in the **Histogram Tab** that you have complete control of the **Live Image Histogram** which allows you to either manually control the **brightness** of each of the color 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.

Histogram	^
	RGB
	R
	G
	В
🗹 Auto Min	🗹 Auto Max
10 🜲	72 🜲
Gamma :	0.26
Line 🔻	Default

Feature	Title	Usage
	Histogram	You can use the 2 controls to manually adjust the image's dark tones (Left control), and the gamma highlight brightness levels (Right control) to regulate the image's contrast, shading, and image layers to obtain the best balance for the image. Moving the Black control to the right darkens the
		image and to the left lightens the image.
		Moving the Gray control to the left brightens the image and to the right darkens the image.
		The goal is to use as much of the necessary data (the graph) between the two controls without clipping the necessary data.
RGB R G B	Color Channel	This allows you to select either all 3 color channels together (Red , Green , and Blue), or select each color independently to use with the above Histogram controls.
🗹 Auto Min	Left Control	This control allows you to enter in a value for the Left Control which represents the amount of pixel value proportion for dark.
10 🗘		When the Auto Min is selected, the software will place the Left control with the minimum value for the color choice (will not provide too much color).
		This control allows you to enter in a value for the Right Control which represents the amount of pixel value proportion for bright.
Auto Max 72	Right Control	When the Auto Max is selected, the software will place the Right control with the maximum value for the color choice (will not provide too little color).

Feature	Title	Usage
Gamma : 0.26	Gamma	Gamma defines the relationship between a pixel's numerical value and its actual luminance (brightness). While the gamma setting affects the brightness of a display, it is not identical to the brightness. This is because the gamma adjustments are not linear, like brightness levels are. Instead, the gamma setting applies a function to the input levels, which produces the final output level. Therefore, the gamma setting affects both the brightness and the contrast of the display.
		Moving the slider to the left darkens the image, while moving the gamma slider to the right brightens the image. Notice what happens to the data in the Histogram
		while you adjust the gamma. The range is from 0 to 0.63 This allows you to select Linear (Line) of Logarithmic
		(Logarithm) as the mathematical algorithm to display your data.
Line	Data algorithm	A linear histogram is a representation of how the camera sees the data.
		A logarithmic histogram is a representation of how our eyes sees the data.
		Compare the shape of the Histogram graph as you switch from Line to Logarithm .
Default	Default	This control resets these module controls back to the factory defaults which is, RGB color level adjustments are manual with a linear representation of the data and the Gamma is set to 0.28.

File Save Tab File Save *

It is here in the **File Save** Tab where you have complete control of the **Filename**, **File Format**, and **File location** when you save snapshots or video of what the HD-10 II is imaging.

File Save	^
🔿 Use Dialog	
Use File Name	
File Name : TS	+ yyyymmddHHMMSS 🔻
Format : 🗌 JPG 🛛 TIF	PNG DICOM
Path : C:/Users/Michael/De	esktop/Image Browse

Feature	Title	Usage
		When this is selected (it is either this or Use File Name) then whenever you take a snapshot or activate a recording, a Save as dialog box will pop up asking for a file name , location , and format .
O Use Dialog	Use Dialog	 c) c) c
O Use File Name	Use File Name	When this is selected (it is either this or Use dialog), then whenever you take a snapshot or activate a recording, the system will use the parameters you have set below to save the image or video.
File Name : TS +	File Name	Whatever characters you place in this box will be the first characters of the name. The remaining characters will be what follows from the drop- down list to the right.
yymmddHHMMSS yyymmddHHMMSS yyyymmddHHMMSS yyyyymmddHHMMSS nnnn	Name Drop Down	This control contains the five drop-down name extensions that follow the preceding File Name . Select any from the list to append to the characters from the above File Name .
Format : 🛄 JPG 🗹 TIF 📄 PNG 📄 DICOM	File Format	Use a checkbox to select the graphics format that you want the image to be saved in.
Path : C:/Users/Michael/Desktop/Image Browse	Path	Using Browse will open-up the Windows Directory for you to locate or create a folder to save your images or videos.

ROI Tab ROI

It is here in the **ROI** Tab (**R**egion **o**f **I**nterest) where you can select a rectangular area of the whole image to become the only region to display in the **Image Window**.

 \mathbf{v}

ROI				^
Selecting	regions of interest(R	01)		
Setting th	e area and coordinat	tes of the re	gion of interest(ROI)	
Width :	108	Height :	108	
StartX :	0	StartY :	0	
		ОК		

Feature	Title	Usage
Feature	Title Select ROI	When this is selected (it is either this or using coordinates), you will be able to draw a rectangle around your object of interest. You will then be given a verification choice by selecting an X or a green checkmark. Image: the checkmark will remove everything except what is in the ROI box. Placing your mouse inside the ROI box, and holding the Left Mouse Click button will allow you to use the scroll wheel on the mouse to Zoom in or Zoom out (if you do not have a scroll wheel on mouse, use the Display Tab located at the top of the screen to zoom in or out).
		To return to normal view, uncheck the ROI checkbox, then Click on the 1:1 choice (<i>if you have resized the image</i>) in the Display Tab .

Feature	Title	Usage
Setting the area and coordinates of the region of interest(ROI) Width: 204 Height: 132 StartX: 192 StartY: 304 OK	Select ROI coordinates	When this is selected (it is either this or Select Region), you will be able to enter the coordinates of the upper left corner of the rectangle, then enter the width and the height of the region into the boxes provided. Clicking of the OK button will remove everything except what is in the ROI box. Placing your mouse inside the ROI box, and holding the Left Mouse Click button will allow you to use the scroll wheel on the mouse to Zoom in or Zoom out (if you do not have a scroll wheel on mouse, use the Display Tab located at the top of the screen to zoom in or out). To return to normal view, uncheck the ROI checkbox, then Click on the 1:1 choice (<i>if you had</i> <i>resized</i>) the image in the Display Tab .

Image Stitching (Live) Tab

It is here in the **Image Sticking Tab** where you can join overlapping images to create a mosaic of a larger area of an object of interest. This control will have very little use in planetary imaging as the objects as relatively small as compare to the Image Window.

Feature	Title	Usage
Stitching Speed : High Speed 🔻	Stitching Speed	This control allows you to choose between High Speed stitching or High-Quality stitching.
Background Color :	Background Color	Clicking on the color will pop up the Color Pallet Window to choose what color you want the background of the stitched image to have. If you use this control, we recommend using a Black background.
Start Stitching	Start Stitching	Clicking of this command will start the procedure, just follow the instruction presented on screen. You will be prompted to keep the exposure withing a specified range, then the command will display the current Image Window. Now slowly move the telescope so that there is an overlap of the image in the new window. If everything is satisfactory, the software will display the new combined images. Keep repeating the above until you have covered the area for the Mosaic. When completed, Click on the Stop Stitching button in the Image Stitching Control. The Image will automatically be saved, and a thumbnail will appear in the Image Tray.

EDF (Live) Tab

It is here in the **EDF Tab** (**E**xtended **D**epth of **F**ield) where you can combine the same image with different focus locations. This control will have very little use in planetary imaging except for the Moon, as most object will have the same focus location.

 $^{\sim}$

EDF(Live)			^
	Quality :	High 🔻	
		Start EDF	

Feature	Title	Usage
Quality: High	Quality	This control allows you to choose between Low , Medium , and High stitching Quality. This is CPU and time intensive. But worth experimenting with.
Start EDF	Start EDF	Clicking on the Start EDF will start the process. Just slowly change the focus to bring other areas of the image into sharp focus. When completed, Click on the Stop EDF button. Image will automatically be saved and a thumbnail place in Image Tray. Focused across the whole image Focused across the middle of the image

Video Record Tab

It is here in the **Video Record Tab** where you can save the real time videos of what you are imaging. You have full control on how you want the video saved. Again, the **File Save** Tab indicates the path location, name, ... where the Videos will be saved.

				^
Encoder :	Full frame(No compressio	•		
	10	÷		
	10	÷		
	0	÷	min	Ŧ
rd	Default			
	Encoder : rd	10 10 0	10 · · · · · · · · · · · · · · · · · · ·	10 0 10 0 0 0 0 min

Feature	Title	Usage
Encoder : Full frame[No compressio 🔻	Encoder	This control allows you to choose between no compression and using MPEG-4 compression. We recommend using Full Frame (No compression) .
Video Record	Video Record	 With both Auto Stop and Delay Time unchecked, Clicking on the Video Record button will start the recording prosses. To Stop Recording just click on the button again. You Start and Stop using this button. Else if you have selected Auto Stop, then the software will stop the recording process for you based on your selection criteria (see below). Never use Delay Time when you use the Video Record button to start and stop the recording.
Save to : Hard Disk RAM	Save to	This selection choice is always set to Hard Disk .
Delay Time : 0 ¢ min *	Delay Time	If you check-marked the Delay Timer , then you can enter the amount of time delay before the Mallincam Software executes your Auto Stop settings. Enter a numerical value in the box (or use the up and down arrows), then select a time unit from the dropdown list (minutes , seconds , thousands of a second). Then hit the Video Record button to start the process Remember you can only use this control if you have selected the Auto Stop control.

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Feature	Title	Usage
Auto Stop	Auto Stop	This control allows the software to automatically stop recording without you pressing a key. You have two options, stop after a specific number of video frames has been recorded, or stop after a specific time has elapsed.
Total Frame : 10	Total Frame	With this button selected, you can enter a value of the number of frames that you will allow to be recorded. You have a range from 1 to 9999 frames to use.
● Total Time(s): 9 🗘	Total Time	With this button selected, you can enter a value of the number of seconds that you will allow to be recorded. You have a range from 1 s to 9999 s to use.
Default	Default	This control resets these module controls back to the factory defaults which is No Auto Stop , No Delay and No compression .

Delay Capture Tab

It is here in the **Delay Capture Tab** where you can delay the capture of both the snapshot and the video recording of what the Mallincam HD-10 II is imaging. You can use this tab to have the software automatically capture up to 9999 snapshots. You can also use this tab record a video of the still snapshots.

Delay Capture		^
Total Frame :	10 🗘	
Interval Time(ms) :	1000	
Delay Time:	0 🗘 m	n 🔻
Capture Frame	Capture as Video	

Feature	Title	Usage
Total Frame : 10	Total Frame	With this button selected, you can enter a value of the number of snapshots that you will allow to be taken. Snapshots will be taken one after another unless you enter an Interval Time in which case the Interval Time will be the pause between each snapshot. The images will be saved via the information set in the File Save Tab.

^

You have a range from 1 to 9999 snapshots to use.

Feature	Title	Usage
Interval Time(ms) : 1000	Interval Time	This control allows you to enter the amount of pause the software should take between each snapshot (entered in the Total Frame above). The time is entered in milliseconds (1000 ms = 1 s) You have a range from 0 ms to 9999999 ms
Delay Time: 0 🗘 min 🔻	Delay Time	With this button selected, you can enter a value for the delay before the first snapshot is taken. The time can be entered in units of Minutes , Seconds and Milliseconds . The range of the delay is from 0 s to 120 minutes .
Capture Frame	Capture Frame	Clicking on this button will start the snapshot process. The software will look at the delay time, the number of snapshots requested, and the interval between each snapshot and then execute the procedure. The Capture Frame button will change its name to Stop Capture, where you can abort the procedure by clicking of the button.
Capture as Video	Capture as Video	Clicking on this button will start the video recording of the snapshot process. The software will look at the delay time, the number of snapshots requested, and the interval between each snapshot and then execute the procedure. The Capture as Video Frame button will change its name to Stop Video, where you can abort the procedure by clicking of the button. The video will not consist of real time videos from the camera but consists of stills stitched together. For example, it may consist as a 10 second video of two 5 second frozen frames if the time length of 5 seconds and two frames were selected as the number of snapshots.

Save Settings Tab

It is in this Tab where you can manage groups of parameters. You can save, reload, export and import parameters based on different imaging scenarios. The parameters will consist of every setting available in the camera (except the Flat field).

Save Settings			^
Group Name :		Save	
Group :	•	Load	Delete
	Export		
	Import		
	Reset All		

Feature	Title	Usage
Group Name :	Group Name	Enter the name you would like to give the settings group.
		Click on the Save button to save this group.
Save	Save	Once you click on the button all the current parameters set in the HD-10 II will be saved under the Group Name entered above.
		The Group command (see below will now contain the name of this group for easy access).
Group : 💌	Group	This dropdown box will contain a list of all the previously saved parameter groups. Just select a parameter group form the list then click on the Load button to import.
Load	Load	Once you click on the Load button, all the saved parameters from the selected Group Name will be loaded and set in the HD-10 II.
Delete	Delete	Once you click on the Delete button, the selected Group Name will be deleted from the Group Name Database .
Export	Export	Once you click on the Export button, you will be prompted for a file location to save the parameters that will be saved in the config_file folder inside the requested folder (so create a folder name before executing this command). This folder can be sent to another HD-10 II users who can import the settings into their own camera.
Import	Import	Once you click on the Import button, you will be prompted for a file location of the config_file folder. The imported group name will be added to your database.
Reset All	Reset All	Will reset the current HD-10 II internal camera settings to factor defaults. Thus, overriding current group settings.

Auto Focus Tab Auto Focus

It is in this Tab where you either have the Mallincam HD-10 II auto focus the camera for you, or you can take manual control of the camera's focus routine. You should get your telescope to focus the best it can, then this control can fine tune the focus throughout the evening's imaging.

Auto Focus		^
Continuous focusing	One-Shot AF	
		0
Focus Position: 22.8		-2.4

Feature	Title	Usage
Continuous focusing	Continuous focusing	When checkmarked this control will continuously auto focus the camera. Not recommended for use with astronomical objects as the focus does not change too much.
		Click on the screen and Place the green rectangle on an object in the image that you would like the camera to focus on.
		When checkmarked this control will auto focus the camera.
One-Shot AF	One-Shot AF	Click on the screen and Place the green rectangle on an object in the image that you would like the camera to focus on.
		Once you have achieved focus, uncheck this box.
Focus Position : 22.8 -2.4	Focus Position	You can use this slider to manually focus the Mallincam HD-10 II camera.

Light Frequency Tab

It is in this Tab where you can change the expected light frequency. But not needed for our Astronomical applications.

Light Frequency Light Frequency : O 60HZ O 50HZ

Feature	Title	Usage
Light Frequency : O 60HZ O 50HZ	Light Frequency	Select an option to see if it improves your image.

Other Settings Tab Other Settings

Not activated for the Mallincam HD-10 II

Other Settings		^
	Negative HDR	

Image Tab 📕



The **Image Tab** is the Tab used for adjusting image details of your snapshot images. This Tab allows quick and simple adjustments, but most of us may use other image adjusting software as well.

Image Adjust	~
Image Dye	~
Advanced Computational Imaging	~
Binaryzation	~
Histogram	~
Smooth	~
Filter/Extract/Inverse Color	~

Image Adjust Tab Image Adjust

The Image Adjust Tab allows you to adjust Brightness, Gamma, Contrast, Saturation, and Sharpen on a saved Snapshot.

Feature	Title	Usage
Brightness : 0	Brightness	This slider control allows you to adjust the brightness of the overall image. Moving the slider to the left darkens the image while moving the slider to the right brightens the image. The brightness ranges from -255 to +255 with the default being 0 .
Gamma : 1.00	Gamma	This slider control allows you to adjust the Gamma value for the overall image. Increasing the Gamma makes the dark areas darker and light areas lighter. Gamma is more like contrast than anything else. The Gamma ranges from 0 to 2 with the default being 1 .
Contrast : 0	Contrast	This slider control allows you to adjust the Contrast value for the overall image. Increasing the Contrast increases the difference between the dark and light areas. The Contrast ranges from -80 to 80 with the default being 0 .
Saturation : 0	Saturation	This slider control allows you to adjust the Saturation value for the overall image. Saturation is the intensity of a hue from gray tone (no Saturation) to pure, vivid color (high Saturation). The Saturation ranges from -180 to 180 with the default being 0 .
Sharpen: 0.0	Sharpen	This slider control allows you to adjust the Sharpness value for the overall image. Increasing the Sharpness increases the contrast along the edges of an object. The Sharpen ranges from 0 to 3 with the default being 0 .

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Image Adjust

Brightness:

Gamma:

Gamma:

Contrast:

Saturation:

O
Sharpen:

Apply As A New Image

Default

Feature	Title	Usage
Apply As A New Image	Apply as a New Image	When clicked , will create a new thumbnail of the Image with the changes. You will need to save this image if you want a permanent copy (Click on the Save image as icon at the top of the screen).
Default	Default	When clicked , this control will reset all adjusted parameters back to factory defaults.

Image Dye Tab Image Dye

The **Image Dye Tab** allows you to create false color images with a color overlay. Picking a color from the palette will shade the whole image with that color in appropriate intensities.

image Dye		~
Current :	RGB(255, 255, 255)	
	RGB Add To New Dye	
Dye Type :	Brightfield	•
New Dye :	▼ De	lete
	Apply As A New Image	
	Cancel	

Feature	Title	Usage
Current : RGB(255, 255, 255)	Current	This displays the current of optional color for the palette. Clicking on any of the colors will shade the image with the color.
RGB	RGB	Clicking of this button will pop-up the Window's color selection palette, so you can choose a color other than the ones provided.
Add To New Dye	Add To New Dye	Clicking on this button will allow to save your above newly creates color to a palette name of your choice so you can recall it quickly.
Dye Type : Brightfield 🔹	Dye Туре	This dropdown list contains the various built in color palettes for you to choose from.
New Dye :	New Dye	This dropdown list contains the list of your Add To New Dye creations. Select a Dye color from the list to apply to your image.
Delete	Delete	Will delete your current New Dye from Database.
Apply As A New Image	Apply As A New Image	Will duplicate the original image, but now with the new Dye color. If required, you will need to save this image via the Save Image As icon.
Cancel	Cancel	The button will cancel Dye color applied to image.

The **Advanced Computational Tab** allows you merge saved images to either improve their depth of view, create a mosaic of the overlapping images, or produce an image with a High-Dynamic Range.

Advanced Computational Imaging

Extend Depth Of Field (EDF)
Image Stitching
High-Dynamic Range (HDR)
Apply As A New Image

Feature	Title	Usage
C Extend Depth Of Field (EDF)	Extend Depth of Field	This control will provide you with a directory pop- up so you can select the saved images that cover the same object but with different focus frames. The software will then merge these images together providing an image with a focus across all regions (extends the depth of view). You will have the option of clicking Apply As a New Image to place this merged image on your Image Tray .
O Image Stitching	Image Stitching	This will control will provide you with a directory pop-up so you can select the saved images that cover the same object but with overlapping areas. The software will then merge these images together providing an image which covers a larger area of the object that would not otherwise be possible for you due to the restricted field of view of your telescope. You will have the option of clicking Apply As a New Image to place this merged image on your Image Tray .
O High-Dynamic Range (HDR)	High Dynamic Range	This will control will provide you with a directory pop-up so you can select the saved images that cover the same object but with different exposure times. The software will then merge these images together providing an image which covers the same object but provides details of faint components without blowing out the details of the bright components. You will have the option of clicking Apply As a New Image to place this merged image on your Image Tray .
Apply As A New Image	Apply As a New Image	Use this button if the merged images are worthy of saving as a new image.

Binaryzation Tab Binaryzation

The **Binaryzation Tab** allows you to set the grayscale value of the pixels from a range of 0 to 255. The end result of this process is to create an image which is truly Black and White (no grays).

Binaryzation				^
Threshold :		Start Binaryzati	on	0
	Default	Apply	Cancel	

Feature	Title	Usage
Start Binaryzation	Start Binaryzation	Checkmarking this box will start the binary conversion of pixels to either Black or White. The Threshold value (see below) will determine which pixels are converted the Black and which pixels are converted to White. Image: Converted to White in the binary conversion of pixels are converted to White. Image: Converted to White in the binary conversion of pixels are converted to White. Image: Converted to White in the binary conversion of pixels are converted to White. Image: Converted to White in the binary conversion of pixels are converted to White. Image: Converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are converted to White in the binary conversion of pixels are conversion
Threshold : 0	Threshold	This slider will allow you to adjust which range of data pixels will be converted to Black and which range of data pixels will be converted to White . Moving the slider to the right will increase the number of pixels being converted to Black . The slider range is from 0 to 255 with the default being 57 .
Default	Default	This button will set the Binaryzation value to 57 .
Apply	Apply	This button will permanently apply the Binaryzation to the image. If you need to save this image, use the Save Image as icon.
Cancel	Cancel	If you have not clicked on the Apply button, you can undo the Binaryzation process on your image.

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Histogram Tab Histogram

It is here in the **Histogram Tab** that you have complete control of the **Saved Image Histogram** which allows you to either manually control the **brightness** of each of the color channels or let the software perform this task for you. This allows you to pull out as much detail (**Shadows**, **Midtones**, **Highlights**) hidden in the image as you can. The Histogram provides a quick picture of the tonal range of the image,

Histogram			^
			RGB
			R
			G
			В
A		<u></u>	Auto
0 🗘		255 ≑	
	Apply Cancel		

Feature	Title	Usage
	Histogram	You can use the 2 controls to manually adjust the image's dark tones (Left control), and the gamma highlight brightness levels (Right control) to regulate the image's contrast, shading, and image layers to obtain the best balance for the image. Moving the Black control to the right (or enter a larger number) darkens the image and to the left lightens the image. Moving the Gray control to the left (or enter a smaller number) brightens the image and to the right darkens the image. The goal is to use as much of the necessary data (the graph) between the two controls without clipping the necessary data.
RGB R G B Auto	Color Channel	This allows you to select either all 3 color channels together (Red , Green , and Blue), or select each color independently to use with the above Histogram controls. You can also have the software automatically determine the best Histogram settings for you. This control allows you to apply the changes performed on the image via the Histogram sliders.
Apply	Apply	If you decide to keep the changes, don't forget to use the Save Image As icon.
Cancel	Cancel	This control allows you to cancel the changes performed on the image via the Histogram sliders.

Smooth Tab Smooth

The **Smooth Tab** allows you apply any of the three techniques of smoothing your image to both reduce the noise and the level of detail. The choices are **Gaussian Blur**, **Box filter**, and **Median Blur**. This control will not be of too much use for astronomical images unless you are using it for artistic purposes.

Smooth				^
		Start Smooth	ı	
		Gaussian Blur	•	
Radius :				0
	Default	Apply	Cancel	

Feature	Title	Usage
Start Smooth	Start Smooth	Checkmarking this box will start the smoothing of pixels by using the algorithm chosen below.
Gaussian Blur 🔻	Gaussian Blur	The visual effect of the Gaussian Blur technique is a smooth blur resembling that of viewing the image through a translucent screen. The Radius slider below allows you to control the amount of blur. The range is 0 (little blur) to 30 (a lot of blur).
Box Filter 🔻	Box Filter	The visual effect of the Box Filter Blur technique is a smooth blur performed by averaging the pixels around an individual pixel. The Radius slider below allows you to control the size of the box (thus the amount of blur). The range is 0 (little blur) to 30 (a lot of blur).
Median Blur 💌	Median Blur	The visual effect of the Median Blur technique is a smooth blur performed by calculating the median of the pixels around an individual pixel. The Radius slider below allows you to control the size of the box (thus the amount of blur). The range is 0 (little blur) to 30 (a lot of blur).

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Feature	Title	Usage
Radius : 0	Radius	The purpose of this slider is to control the amount the selected algorithm will affect the image. The range is from 0 (no affect) to 30 (maximum affect).
Default	Default	Set the default value for each of the above selected algorithms. The Default value is 0 (no blur).
Арріу	Apply	If you like the blurred image and you want to make it permanent, then clicking on this control will do that. If you would like to save the blurred image remember to use the Save Image As icon above.
Cancel	Cancel	If you don't like the blurred image and you want to return the image back to normal, then clicking on this control will do that.

Filter/Extract/Inverse Color Tab

Feature

Filter/Extract/Inverse Color

The **Filter/Extract/Inverse Tab** allows you to play with the colors of the image, by either removing a specific color, selecting, or even complementing colors to try to illustrate deeper structure in the image.

Title

olors of the ven n the image.	Filter Color Extract Color Inverse Color Apply Cancel
•	elect a color that you ncing your image via

Filter/Extract/Inverse Color

Color: Red

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Color: Red 🔻	Color	This control allows you to select a color that you would like to have in enhancing your image via the controls below. The dropdown list provides you a choice of red , green , or blue .
Fitter Color	Filter Color	This control will filter out the selected color from the pixels of the image. This leaves an image consisting of the combination of the remaining two colors. For example, see below on the right an image of the Moon with the Red channel filtered out.

Usage

Feature	Title	Usage
Extract Color	Extract Color	This control will filter out every color except the selected color from the pixels of the image. This leaves an image consisting of only the selected color. For example, see below on the right an image of the Moon with the Red channel Extracted.
		This control will invert (reverse) every pixel value of the image. For example, see below on the right an image of the Moon with the Inverse selected. Lights becomes darks and vice versa.
Inverse Color	Inverse Color	
Apply	Apply	If you like the color changed image and you want to make it permanent, then clicking on this control will do that.
		If you would like to save the color changed image remember to use the Save Image As icon above.
Cancel	Cancel	If you don't like the color changed image and you want to return the image back to normal, then clicking on this control will do that.

Display Tab



The **Display Tab** allows you to zoom in or out, resize or even reset the real time image screen to its default size. Here you also will be able to flip or rotate the image for your needs.

Ð	Zoom In
Q	Zoom Out
[0]	1:1
¢	Fit
2	Black Background
	Black Background Full Screen
-	-
-	Full Screen

Feature	Title	Usage
⊕ Zoom In	Zoom in	Clicking on this control will zoom in on the image. Once activated, your scroll key on the mouse can be used to quickly zoom in and zoom out. The Fit control (see below) will automatically resize the image to fit inside the Display Window. Left-Click- Hold and Drag can be used to move your view in the zoomed window.
Q Zoom Out	Zoom out	Clicking on this control will zoom out on the image. Once activated, your scroll key on the mouse can be used to quickly zoom in and zoom out . The Fit control (see below) will automatically resize the image to fit in the Display Window . Left-Click-Hold and Drag can be used to move your view in the zoomed window.
۲. 1:1	1:1	Clicking on this control will show the image at 100% of its size (which may be larger than your monitor's window size). See below on how this Fit controls the whole image in the video window.
Ö Fit	Fit	Clicking on this control will resize the image so that it fills up your Display Window size.

Feature	Title	Usage
Slack Background	Black Background	Clicking on this control will make your image take up the whole screen (no control tabs visible). You can return to a screen with control tabs by either hitting the ESC key on your computer or clicking on the curvy arrow located at the bottom right side of your image.
23 Full Screen	Full Screen	Clicking on this control will make your image take up the whole screen (no control tabs visible). You can return to a screen with control tabs by either hitting the ESC key on your computer or clicking on the curvy arrow located at the bottom right side of your image. Identical to Black Background control.
🔺 Horizontal Flip	Horizontal Flip	Clicking on this control will flip the image so the left side becomes the right side and the right side becomes the left side.
Vertical Flip	Vertical Flip	Clicking on this control will flip the image so the top of the image becomes the bottom of the image and the bottom of the image becomes the top of the image side.

Capture Tab or the Image Tab by moving them up or down the list. Clicking on OK save the new format.

Info Tab Info

The Info Tab allows you select which language you would like to see the controls in. You can also find the version number of the software currently installed on your computer along with information about the camera.

the Mallincam software, press the OK button then restart the software with that language. Language (Take effect affter res Preferences Preferences... Not installed (after all – you are reading the best ⑦ Help Help help there is) Provides information about the hardware and current software version. MALLINCAM Beebel Be7508 About About... MallinCam

More Information

Config Tab

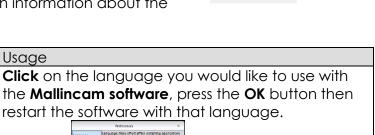
🛞 Rotate 90;ã

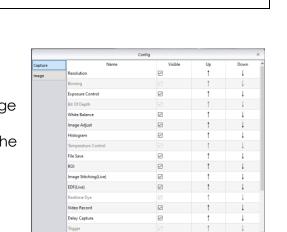
The **Display Tab** allows you select which controls are visible in either the Capture Tab or the Image Tab. You can also change the order in which the control tabs appear in either the

Rotate 90

Title Feature Usage

Page 60





Preferences...

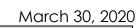
⑦ Help (i) About.



Clicking on this control will rotate the image 90°

Usage

clockwise.



On Screen Controls

Feature	Title	Usage	
B	Save Image As	When in the Image Tab , this icon is located on the upper right of the Display Window , Clicking on this icon will open up the Save image window where you can choose a location, file name, and file format to save the current image on Image Tab screen.	
By	lmage Crop		
	Sizer	Clicking on these icons will increase the size of the Display Window either on the left of right by removing the Feature Tab or Image Tray. Again, clicking on the icon will reduce the Display Window's size by bringing back either the Feature Tab or the Image Tray.	

7. Appendix

Appendix A: Using HD-10 II both on a Computer and a HDMI Monitor

You can use the HD-10 II on both a computer and a HDMI monitor at the same time. You connect the HD-10 II camera to the computer as you normally would, but you also connect the HDMI cable to the HDMI monitor. This way others can see the results of your adjustments on the HDMI Monitor while you have a private computer screen to make the adjustments on.

Using this scenario, you will not have a mouse connect to the HD-10 II camera (the **usb** cable is connect to computer), so you will not be able to control the image via the HDMI monitor.

Appendix B: Using the 1.25" 0.5 x Focal Reduce

A focal reducer is a set of converging (or positive) lenses that cause the light from a telescope objective to converge at a steeper angle to the focal plane of the HD-10 II camera. It is as if it were coming from an objective with a faster (lower) focal ratio and a shorter focal length. When placed in the focal plane in front of the HD-10 II or eyepiece, this focal reducer leads to a wider field of view and a brighter image of extended objects, which is important for reducing the exposure times when imaging faint extended objects like the Moon, nebulae or galaxies. You will need to have more in-focus room when using a Focal Reducer.





Attaching the Mallincam Focal reducer

The Mallincam 0.5 x Focal Reducer has a standard 1.25" filter thread both sides, and can be stacked with filters, such as the Mallincam IR or the Mallincam Polarizer Filters. It is attached by screwing into the 1.25" Mallincam camera nosepieces (or even used with eyepieces), and because the barrel has a 1.25" outer diameter, it can be inserted with the nosepiece into any standard telescope's 1.25" focuser. The focuser comes with a 25mm space if required for your setup to push the reducer further away from the camera.



Appendix C: Using Filters

There are some astronomers who love the unfiltered view from the telescope to sensor (or even eye), and there are those who love to enhance the detail that filters provide. Filters, which are placed in the optical path of a telescope in front of the camera to allow (or block) specified wavelengths of light hit the sensor. Each filter has a job to do, and the more specialized that job, usually the more expensive the filter. For use with the Mallincam HD-10 II there are two filters that may be of interest to you.

Mallincam Polarizing Filter

A polarizing filter is like a dimmer switch between the telescope and the camera. It is best for very bright planets and of cause the Moon. This filter will provide a better contrast thus revealing more surface detail.

Mallincam IR Filter

The Mallincam cameras are very sensitive across the visual spectrum, as well as in infrared. Telescopes are not designed to block the IR spectrum which can make some of your images, even though focused, look slightly defocused. This blurring effect can cause your images to lose their finer detail. This filter will block that IR while maintain the color fidelity of the image.



Appendix D: Connecting to Night Skies Network (NSN) using the HD-10 II 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

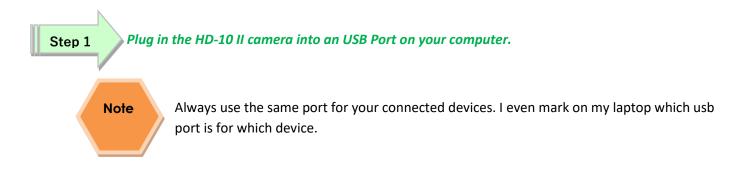
Computer real estate will be your nemesis. So, the size of the monitor (laptop), number of screens that you are using, and the number of software programs being used simultaneously will dictate how you will manage your windows. I will describe how I have organized my windows under a variety of situations (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 II is what Video capture software are you going to use. Some simple suggestions:

The HD-10 II 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 II 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 II'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 II Control Software.



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

Get the image of your object on the Image Window of the HD-10 II 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 II Software to the second monitor.



During your initial **NSN** experience, you will find it difficult to even get the object of interest onto the HD-10 II 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



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

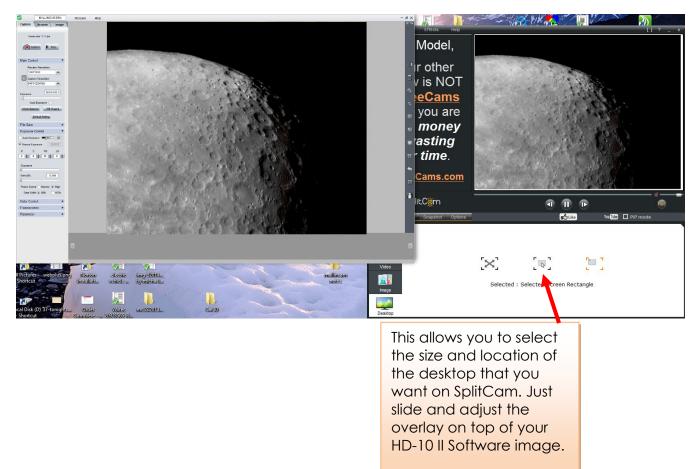
Step 4

Have Manycam/ Splitcam/Webcam Max grab the Desktop image



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 II 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 II Software is looking at inside the Manycam/Splitcam/Webcam Max window.

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Step 5

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



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 II VIDEO Software) image location.

Note

I User Manual March 30, 2020 Do not move the HD-10 II Window around your desktop when broadcasting, since Manycam /Splitcam/WebcamMax is just grabbing the real-estate location that currently your HD-10 II Software image is situated at. If you move the HD-10 II Software Window, then Manycam /Splitcam/ Webcam Max will still grab the desktop location but may not grab the whole HD-10 II Video Image. Don't be afraid to practice moving the HD-10 II 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: <u>http://www.nightskiesnetwork.ca/</u>. 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.

	NIGHT SK	IES NETWORK SPONS	ORED BY MALLINCAM	Logout of
Р	lease verify your login to) broadcast		
Q	Channel Name / Username	mjburns		

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*.

Waterloo Observatory			STOP	
🔭 Waterloo Observatory 🔾 🖲 🖄 🙎 🕴	Ehannel Ehat	Sound Effects 🖌	ن بانوسوری (۱)	
	Welcome! NetConnection.Connect Success You are broadcasting on channel V Welcome! NetConnection.Call.Failed	Naterloo Observatory	A Waterloo Observato	
				Adobe Flash Player Settings
00:19				Camera and Microphone Access www.nightStiesnetwork.com is requesting access to your camera and microphone. If you click Allow, you may be recorded.
	SEND			Allow Ceny

Step 10 Turn off your Microphone

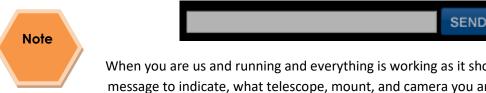
Until you have your microphone figured out, it is best to initially turn it off. If you do not, the viewers on NSN may hear an extreme loud buzzing (feedback noise). Later on, we will look at using the microphone, but until then I recommend *CLICKING* on the little *microphone symbol* on the upper right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



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.



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.

🧕 ManyCam V Bandwidth	irtual Webcam	24
Picture		6
Resolution	HDCAM (1440×108)	•
Framerate	High (15FPS)	-
🛔 Microphone	(Realtek High Defin	ition Audio
Rate	Talk (11Khz) 🔻	

- 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 II 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.



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 E – First Aid for the HD-10 II

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

- **Diagnosis:** This software automatically looks for the HD-10 II camera when it starts. If it cannot locate the camera attached to a USB Port, it will shut down.
- **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 II camera (also check power).
 - Restart the Software

Second step: Verify that in Device Manager that the driver for the HD-10 II 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 II 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 II 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 II is frozen, or the commands do not seem to be working correctly.

- **Diagnosis:** Somehow the HD-10 II 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 II 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 II 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.