



Software Manual

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Introduction

Congratulations on your purchase of an Atik Infinity camera. The Infinity is engineered to provide incredible views of the universe in a near-real time environment.

Infinity is also the name of our standalone software application designed for video astronomy and near-real time viewing. It features a number of integrated pre-sets to get you started with minimum set up, while ensuring you always remain in control.

Key features of the software include:

- Live continuous stacking
- Adjustable histogram and auto range selection
- Finder mode for easy sky search
- Session record and replay functions
- Live broadcast integration
- Second screen image pop-out
- Save in FITs, JPEG and PNG formats

Getting Started

Installing the Software

The Infinity software and camera drivers are included on the CD-ROM shipped with your Atik Infinity camera. They are also available for download from the Downloads page of our website at www.atik-cameras.com/downloads. This is also where you'll find future updates to the core software.

To install the software:

- Download the core software installer OR insert the CD-ROM
- Run the file "SetupArtemisUniversal.exe"
- Follow the prompts, ensuring 'Drivers' and the Infinity software are ticked, along with any additional software and plug-ins you may require
- The software should now be installed

When connecting the camera to the computer, an "Installing Device Drivers" message should pop up. Follow any prompts, clicking 'continue anyway' if asked.

Once the driver is installed, the camera is ready to use.

Connecting the Infinity

After installing the software and drivers, you're ready to connect your camera. Simply connect the power cable to the camera and connect the camera to the computer. The software will automatically recognise when an Atik Infinity camera is connected.

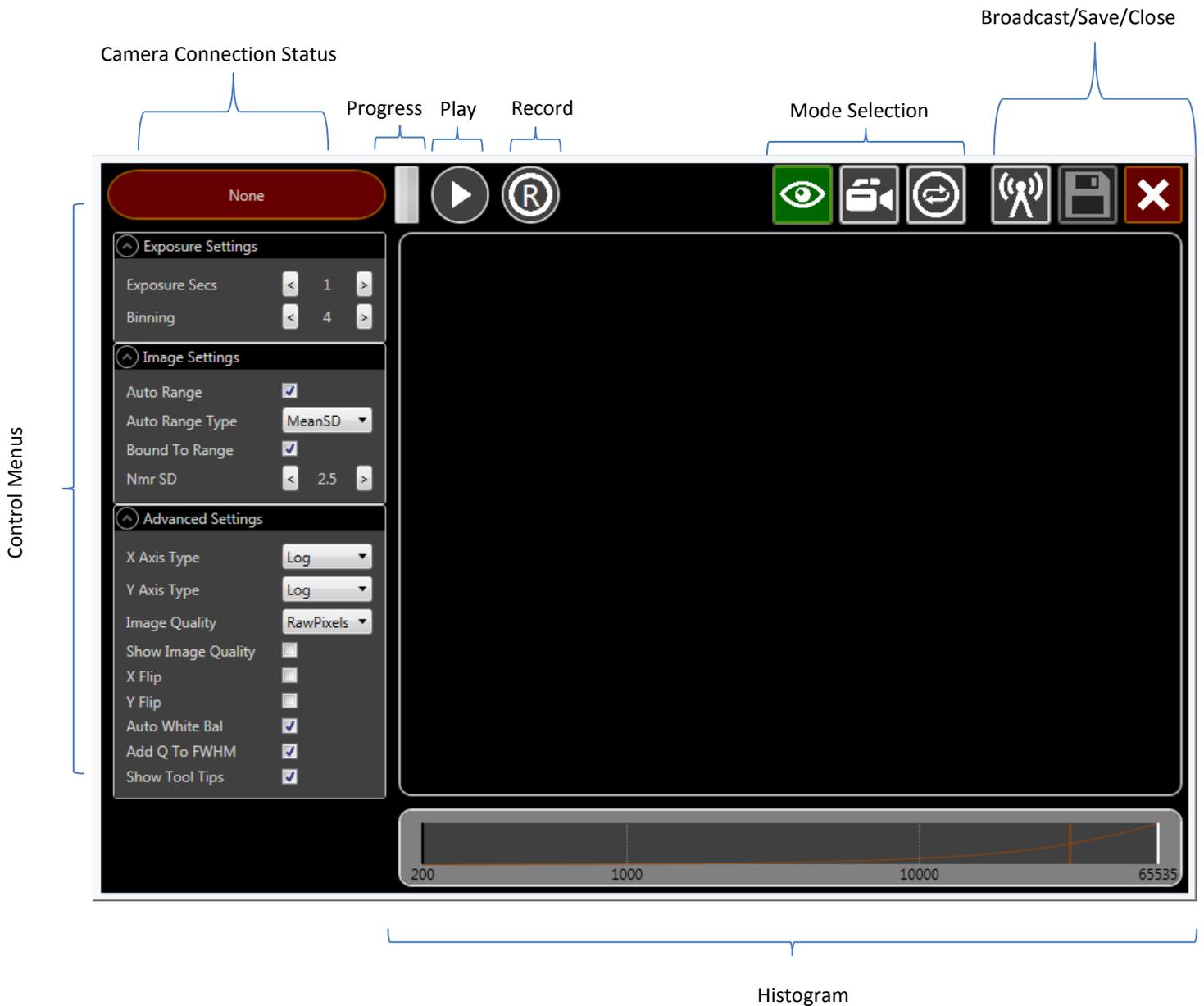
The connection status of the camera will be displayed in the lozenge in the upper left corner.



Troubleshooting Tip: If the camera is connected to the computer, but not showing in the lozenge, check the camera is powered on and showing in the device manager. If not, try reinstalling the latest camera drivers.

Main Screen

This is the main screen of Infinity.



Infinity will automatically load in full screen view and in Finder Mode. To shrink the window, simply double click anywhere in the black bar at the top of the screen. The window can then be resized as desired. Double click in the top black bar again to maximise the window.

Mode Selection

Infinity has three key operation modes optimised for different parts of your session.

Finder Mode



Finder mode is designed to help you find objects in the night sky with ease. This provides a fast, highly sensitive image to help you find objects easily. Exposure and binning settings can be changed as described later.

Note: This may produce noisy images – this mode is simply designed to help you move around the night sky and find objects as quickly as possible. You will notice a far lower noise level once in Video Mode.

Video Mode



Once you've found and positioned your object, switch to Video Mode for optimum display. Video mode will automatically be set to 1 second exposures at binning 1. The optimum exposure time will depend on the brightness of the object and the other equipment in use.

Replay Mode



Replay mode allows you to replay and review previous sessions with your Atik Infinity. This can be particularly useful if you want to share a session after the event, or are looking to post-process the data you obtained. How to record a session is covered in the 'Recording and Saving Images' section of this manual.

Replay mode will automatically use the same exposure settings as were used in the original session. Histogram settings are not saved and remain fully adjustable throughout the replay. The progress bar shows you how far through the session you are, and shown above is the number of the image currently on screen.

The rewind and fast forward buttons can be used to skip between images. Clicking with the left mouse button moves backwards or forwards by a single image, while clicking with the right mouse button skips backwards or forwards by ten images. Hovering over the rewind and fast forward buttons gives you the option to 'Go To Start' or 'Go To End' of the session.

Taking an Image

Play

To begin exposing, simply press the play button. The camera will continue to expose using the relevant exposure time when switching between Finder and Video mode. To stop the camera exposing, simply press the stop button. The camera will also stop exposing when entering or exiting Replay mode.

Exposure Progress

The remaining time of an exposure is shown in the progress bar next to the Play button. The progress may not be as apparent at exposures below 0.5 seconds as these are so fast. If this is the case, the camera will still be exposing, as will be seen in the constantly updated images on the screen.

Exposure Times

The Infinity software is capable of exposures from 0.001s to 120s.



To change the exposure time, use the Exposure Secs arrows in the Exposure Settings menu. The left arrow decreases the exposure time and the right arrow increases the exposure time.

Tip: When first using Infinity, try experimenting with exposure times to find the best performance for your individual set up. Different types of mount will have different tracking abilities, so start viewing with short exposure times and build up to find what works best for you.

Binning

Binning is a process that combines a given number of adjacent pixels to create 'bigger' pixels. This enhances sensitivity at the sake of resolution.

Binning is particularly useful to increase sensitivity when finding objects, allowing you to use shorter exposures and find things faster.

To get the highest resolution from your camera, it's best to view at binning 1, which is the native resolution of the camera. However, for very faint objects, or when you're looking to maximise faint details on an object, using 2 binning is a good and easy way to boost the sensitivity.

To change the binning, use the Binning arrows in the Exposure Settings menu. The left arrow will decrease the binning level and the right arrow will increase the binning level.



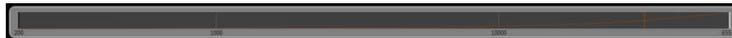
Binning and Colour Cameras

Binning a colour camera results in a black and white image. As colour cameras have individual red, green or blue filters over each pixel in a pattern called a Bayer matrix, binning essentially combines pixels of different colours. This then makes it impossible to extract colour information from the image. This may not be of concern when finding objects, but is not recommended for viewing objects with a colour camera.

Image Display

Infinity contains a number of options to control how an image is displayed, making sure you get the most out of different types of object.

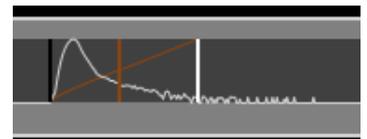
Histogram Function



The histogram is displayed across the bottom of the screen. This essentially shows you the saturation of your image, with 0 representing a black pixel, and 65, 535 representing a fully saturated, white pixel.

The histogram can be adjusted to get the best views of any object.

Adjusting the Histogram



The histogram can be manually adjusted using the levels sliders. There is a black level, grey level and white level slider to alter the different levels. These can be moved by clicking and dragging the desired slider to the desired position.

The black and white levels can also be adjusted by clicking in the desired place on the histogram. Clicking the left mouse button sets the black level and clicking the right mouse button sets the white level.

Note: Clicking either mouse button on the left of the black slider or the right of the white slider will adjust the corresponding slider. This is to ensure the black level can't be set above the white, or the white below the black.

Image Settings and the Auto Range Function

Within the image settings menu is an auto range function. When selected, this automatically sets the black, white and grey levels on the histogram and continues to adjust them as each new image comes in.

There are a number of different types of auto range designed to bring out different details on different types of object.

Full Range – displays from the lowest to highest pixel values

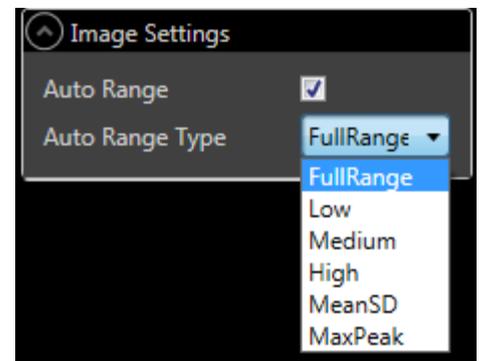
Low – large stretch, best for fainter objects

Medium – medium stretch, versatile for a range of objects

High – short stretch, best for finding and aligning objects

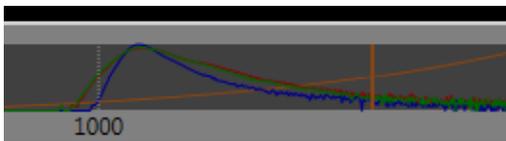
MeanSD – average pixel value plus the number of standard deviations, 'Bound To Range' ensures it won't go above or below the highest or lowest pixel values

MaxPeak – stretch based on highest peak



Colour Histograms

When using a colour camera, the histogram will display separate curves for the red, green and blue channels. These are automatically aligned to produce an accurate colour balance. If you would like to turn automatic colour balancing off, uncheck the 'Auto White Bal' check box in the Advanced Settings menu.



Note on Histogram Scale

The histogram is automatically set to a logarithmic scale as this is usually most effective when dealing with the faint signals associated with this kind of image capture. This prioritises signal at the lower end of the scale and provides more control where you need it most.

However, if you'd rather use a linear scale, go to Advanced Settings and select 'Normal' for the Axis Types.



This can be changed at any time.

Zoom and Image Navigation

The resolution of the Atik Infinity means you can zoom in to get a closer look at certain details or regions of an image. This is also a useful way of getting a 'fuller' view of smaller objects. There are a few different ways to zoom in and out:

- Use the scroll wheel of the mouse
- Use the scroll feature of the trackpad on a laptop (if applicable)
- Double left-click on the image to zoom in
- Double right-click on the image to zoom out

To move around an image, simply click, hold and drag the image to the desired location.



Reset View

To reset the image to its original position, hover the mouse over the image area and press the reset button. This will re-centre the image and resize it to fit the viewing window.



Full Screen

Full screen view maximises the image to the full size of the Infinity window. This means that once you've finished altering the controls for a particular object, you can get an uninterrupted view of the image as it continues to stack and faint details become more apparent over time.



To return to normal view and bring back the controls, simply click on the 'revert' button.



Second Screen Pop-Out

There are times when using Infinity that you might wish to display a duplicate of the image window on a second screen. This is particularly useful for outreach and educational events, so you can display only the image without the control settings.

The software will automatically detect when you have a second monitor attached to the computer. When a second monitor is attached, you will see a screen pop-out button when hovering over the image window. Simply press this to create a second screen pop-out.

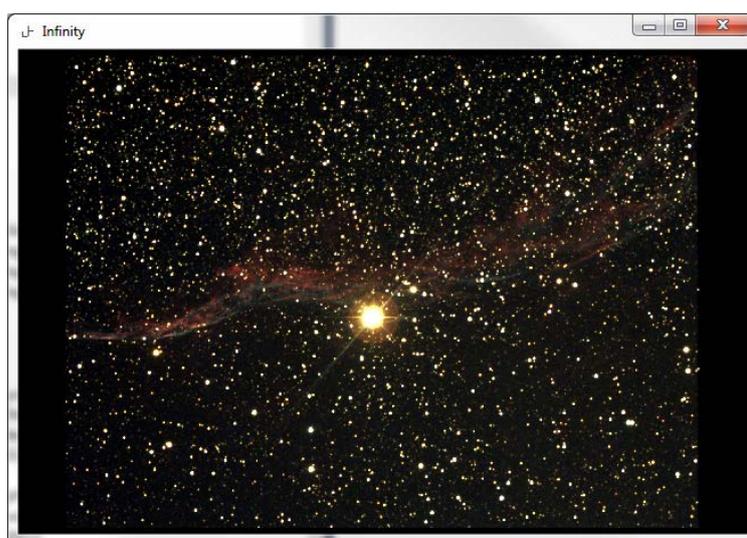


Image Orientation

There may be times when you want to alter the orientation of a particular object. This can be done in the Advanced Setting Menu.

To flip the image on a horizontal axis, check the X Flip box.

To flip the image on a vertical axis, check the Y Flip box.



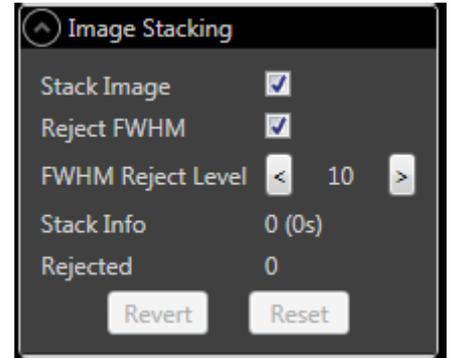
These can be selected and unselected at any time, during either exposure or replay.

Image Stacking

Image stacking is a process which builds up a high quality image from a number of short exposures.

Stacking settings can be accessed through the Image Stacking menu, available in both Video and Replay Modes.

To begin stacking images, simply select the **Stack Image** check box. This can then be turned off at any point.



Stack Info shows how many individual images are in the current stack, along with the total combined exposure time for the images in the stack (s).

Reset resets the stack.

The stack may also reset itself automatically if detects you are moving to a new target.

The rejection feature will be covered in Image Quality.

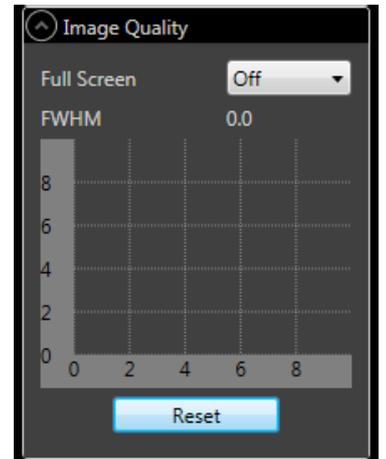
Image Quality

Infinity contains some advanced features to help improve the quality of your images. These can be accessed through the Advanced Settings Menu.

The Image Quality drop-down box allows you to select from RawPixels or BlendPixels. This controls the method used to display the image.

Select the Show Image Quality check box to open the additional Image Quality Menu.

In the Image Quality Menu is a graph displaying Full Width at Half Maximum (FWHM) measurements for each image. This is the average width of the stars in the image and ideally we want this figure to be as low as possible and to remain at a consistent level. The FWHM is shown as a blue line on the graph.

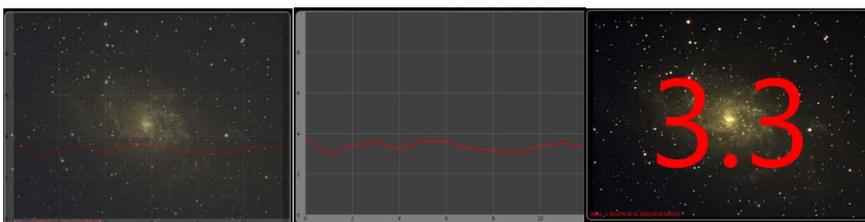


Full Screen options

Hybrid – Overlays the image with the image quality graph

Graph only – displays only the graph in the image window

Number Only – displays the FWHM measurement in numerical form over the image



Focusing

You can use these FWHM figures and display options to help you with focusing, as well as image rejection. Adjust the focus on your telescope until the FWHM is at its lowest point, and the stars also appear visually sharp.

Image Rejection

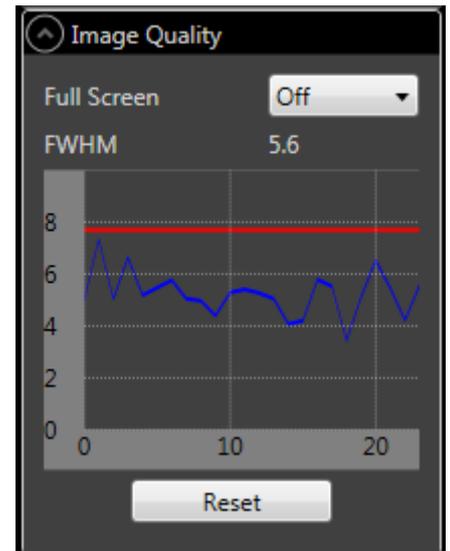
Infinity is able to detect 'bad' quality images and leave them out of the stack.

If your conditions and your images are consistently of a very high quality, you may find you don't need to use the image rejection feature. However, if images are coming in that are blurry, unfocused or have other issues, you may want to turn image rejection on.

Reject FWHM sets the level at which images are to be rejected, using the FWHM measurement. If new images come in with a FWHM above the desired level, these will be rejected. The rejection level will be displayed on the Image Quality graph as a red line. You can then easily see how this corresponds to the blue line of the FWHM and use this to set a sensible rejection level for a given session.

Rejected shows how many images have been rejected from the stack. If more are being rejected than added, you may want to adjust the rejection level. It might be worth checking the FWHM of a visually 'bad' image and setting this as the rejection level.

Revert removes the last image from the stack.



Why are images rejected?

There are many reasons why images might be rejected from the stack. These can range from a gust of wind or something passing in front of the scope, to ground vibrations and changes in atmospheric seeing. A relatively small number of rejected images is to be expected and isn't anything to worry about.

Recording and Saving Images



Saving a Whole Session

To save a whole session, press the 'record' button displayed in the finder and viewer modes. This will record every image that comes in from the camera in FITs format for as long as record is selected.

This feature allows you replay entire sessions at a later date and be sure you'll never miss a detail.

Select a save directory by hovering over the record button and selecting Directory. The button will turn green when recording is enabled.



Saving Displayed Image

You can also save the currently displayed image by pressing the save button. You can save in FITs, JPEG or PNG format for sharing the results of your session, or to go on and post-process the image. Even if using the session record feature, at times it's still worth saving the displayed image, particularly if you've built an impressive stack, or created a perfectly balance histogram.



Live Broadcast

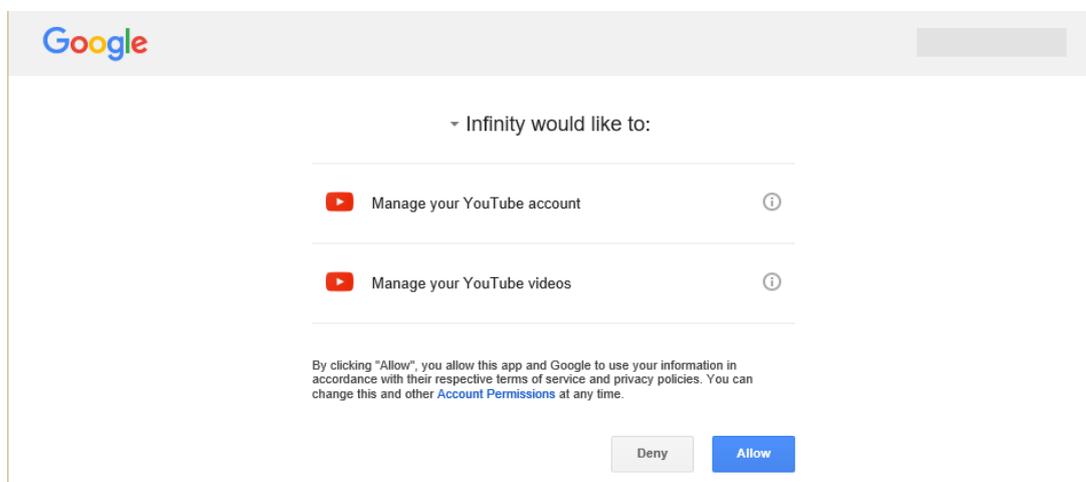
Infinity comes with an integrated live broadcast feature. Infinity broadcasts through YouTube, taking advantage of a well-established and open platform. The only thing you need to begin broadcasting is a Google account and associated YouTube channel. These are free and readily available, and require no further commitment.

Before you begin broadcast, you'll need to enable Live Broadcasting in your YouTube account. See Appendix A for instructions on how to do this.



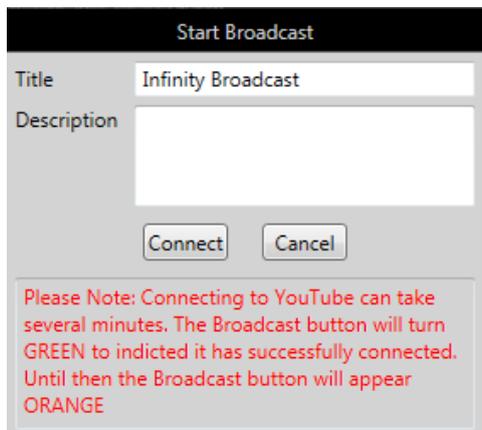
Sign In

The first time you use the broadcast feature in the Infinity software, you'll be required to sign in to your Google account and allow Infinity permission to manage your YouTube account and videos – this is needed simply to set up, stream and save new videos as directed by you and won't be used for any other purpose. Pressing the Sign-in button will open your browser and allow you to sign in to your account and grant this permission.



Once live streaming is enabled and you have signed in through the Infinity software, you will be able to create a new broadcast.

To start a new broadcast, hover over the Broadcast button and select Create Broadcast. Enter a description for your video, and press Connect.



A whole screen capture is used for the broadcast, so first check you don't have anything on screen you wouldn't want to be shared. If looking to perform a more interactive form of broadcast, it may be advisable to use a second device to monitor the live view of the broadcast and respond to any comments being made in the live chat without disrupting the view from within Infinity.

A note on audio: The broadcast will automatically include a live audio stream, allowing you to talk through your session and comment on what you are seeing. This will be done using your default recording device.

Stopping a Broadcast

You can stop a broadcast at any time by selecting 'Stop' from the broadcast menu. This will pause the broadcast, allowing you to reconnect at a later time. This is particularly useful for short stops, for example, if you need to change something with your equipment, or adjust your location.

When you have finished a broadcast, select Complete from the menu. This will end the current broadcast. **You must be connected to the broadcast and select Complete to end it** otherwise the broadcast may continue. YouTube will then automatically process the broadcast and make it available as an MP4 video. Videos under 2 hours in length can then be edited in the YouTube Video Editor, accessible through the Creator Studio. You can also download the video if required, whether to keep as a record, process in external video editing software, or to edit a video over 2 hours in length.



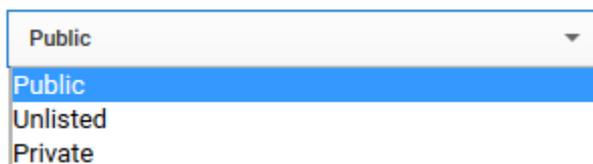
A note on delay: When broadcasting, you might notice that there's a delay of up to around 30 seconds between what you are seeing on your computer screen and what's being displayed in the live stream. This is worth bearing in mind when interacting and responding vocally to comments in the live chat

Upload Speed

There is a recommended upload speed of 1Mb/s to provide a consistently strong and reliable signal for live broadcasting, though it may be possible to broadcast successfully below this.

Privacy Settings

By default, videos and live streams on YouTube will be set to public. This means anyone can find and view your videos. However, you can change the status of videos to either unlisted or private. Unlisted means that only people with a link to the video can view it while private videos can only be seen by people you choose to share them with using a Google+ profile. The privacy settings for a video can be changed at any point.



Additional Information

Tool Tips

Infinity contains a number of 'Tool Tips' which tell you the function of a button when hovering over it to help you learn your way around. These can be turned off at any time by unchecking the 'Show Tool Tips' box in the Advanced Settings Menu.



Technical Camera Information

Technical information about your Atik Infinity camera can be found in the camera manual, a copy of which will have been copied to your computer during the installation process.

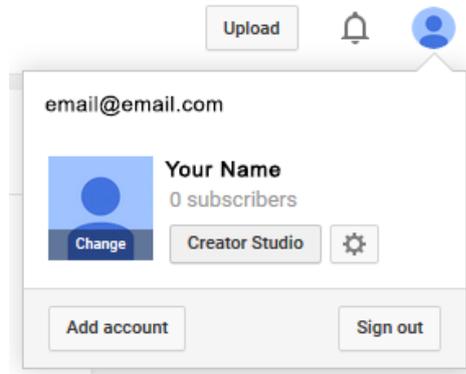
Disconnecting the Atik Infinity

Because the Atik Infinity camera is uncooled, it doesn't require any special disconnection process. Simply close the software and power down the camera, then get ready for the next clear night!

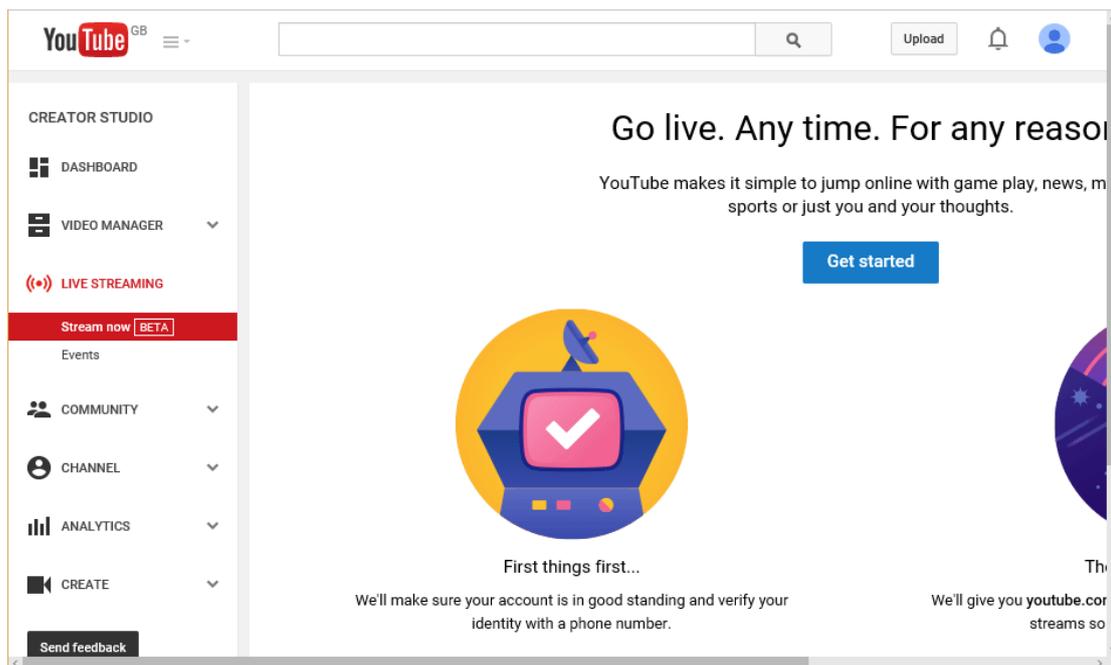
Appendix A

Enabling Live Streaming in your YouTube Account

Before broadcasting with Infinity, you will need to enable Live Streaming in your YouTube account. To do this, first access the Creator Studio through your avatar button in the top right hand corner of the screen.



This will take you to your Creator Studio, where you can access the Live Streaming menu.



From the Live Streaming menu you can then enable live streaming. This will require a two-step verification process where YouTube will send a verification code to your phone and you can then enter this code to verify your account.

You Tube^{GB}

Account verification (step 1 of 2)

Verifying your account by phone allows you to unlock additional features [more](#)

Select your country

United Kingdom

How should we deliver the verification code to you?

Call me with an automated voice message

Text me the verification code

Which language should we use to send you the verification code?

English (UK) [change language](#)

What is your phone number?

For example: [07400 123456](#)

Important: Up to two accounts can be verified per phone number, per year.

You Tube^{GB}

Account verification (step 2 of 2)

A text message with your verification code has been sent to 07809506709. Please enter your 6-digit verification code below.

If you don't get the text message, try going back and selecting the "Call me with an automated voice message" option instead.

Enter your 6-digit verification code

You Tube^{GB}

Upload

Verified

✓

Congratulations! Your YouTube account is now verified.

Once you have completed the verification process, you will then be able to broadcast live through the Infinity software.