



GigaPan

EPIC Pro User Guide

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1. Introduction

1.1 The GigaPan Solution

Capturing stunning gigapixel images is easy with GigaPan - a complete solution with integrated equipment, software and website. The GigaPan EPIC Pro works seamlessly with the GigaPan Stitch software and GigaPan.com to capture, upload and share gigapixel panoramas. Zoom into thousands of stunning panoramas from around the world with the amazing GigaPan Viewer. Join GigaPan.com to view and share with friends, take snapshots and embed panoramas on your own website.

Here is an overview of how easy and fun it is to use the GigaPan System, in 4 simple steps:

1. Pick a scene

The GigaPan EPIC Pro automates the panorama-taking process by taking hundreds of images of the selected scene.

2. Click

The GigaPan EPIC Pro automatically operates your camera to take a series of photographs of your scene.



3. Stitch

The GigaPan Stitch software assembles, aligns and blends the individual images into one large panorama.



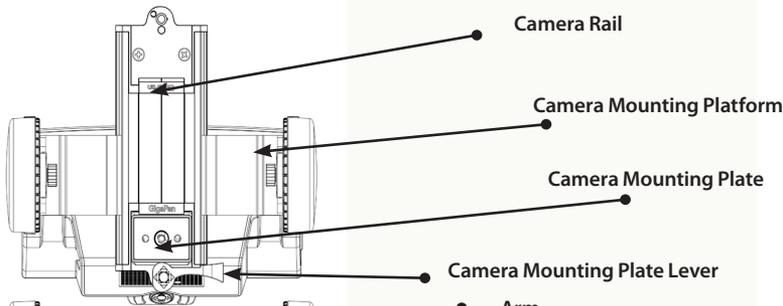
4. Share

The GigaPan Stitch software then uploads your panorama to GigaPan.com to share with friends and the GigaPan community. You also have the ability to embed your uploaded panorama on any website.

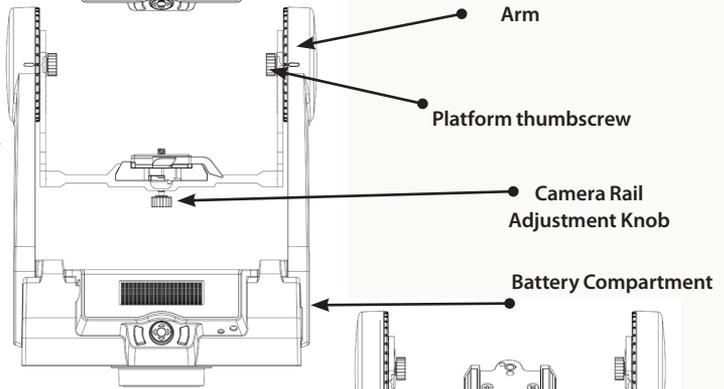
The screenshot shows the GigaPan.com website interface. At the top, there is a search bar and a navigation menu with links for "Home", "About", "Contact", "FAQ", and "GigaPan". Below the search bar, there is a blue banner with the text: "The GigaPan™ process allows users to upload, share, and explore brilliant gigaipan panoramas from around the globe." The main content area features a large panoramic image of the Golden Gate Bridge with many hot air balloons in the sky. Below the image, there is a caption: "The Golden Gate Bridge, seen from Sausalito, Friday 2012, taken by Kelly Robinson (krobin) Selected by Zane as part of the August 15 collection". To the left of the main image, there is a "share" section with a link to "create a free account or login" and a paragraph about sharing panoramas. To the right, there is a "view" section with a search bar and a "MOST POPULAR GIGAPANs" section featuring a thumbnail of the Golden Gate Bridge. Below the main image, there is a "news & events" section with a "GIGAPAN NEWS" heading and several news items, including "SUMMER SALE - GigaPan EPIC now only \$299" and "Visit GigaPan on our official Facebook page".

1.2 GigaPan EPIC Pro Parts

top view

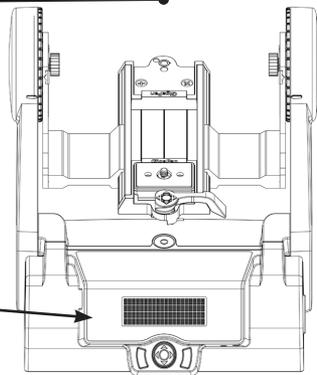


front view



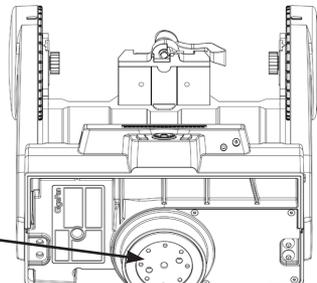
front view, rail inclined

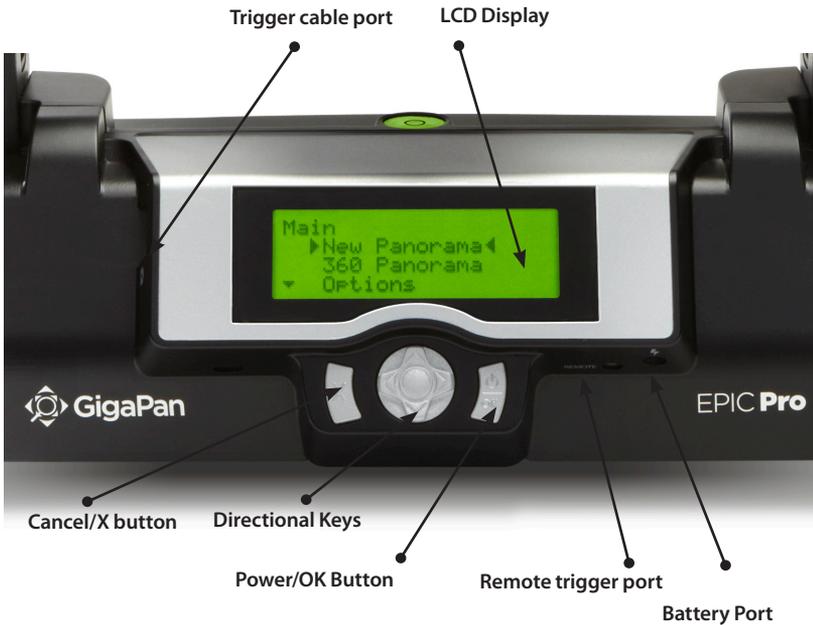
Navigation Panel
(see page 4 for detail)



bottom view

Tripod Mount





Please see Chapter 2: Setting Up the EPIC Pro for more information about how to adjust the EPIC Pro parts to fit your camera and lens.

EPIC Pro Body

Camera Rail - Holds the camera mounting plate and can be adjusted forward or back to accommodate the size of your camera and lens.

Rail Adjustment Knob - Loosen or tighten the knob to move the camera rail when mounting a camera and lens.

Camera Mounting Platform - Holds the camera rail and can be adjusted up or down to accommodate your camera.

Platform Thumbscrews - Loosen or tighten the thumbscrews to move the camera mounting platform.

Camera Mounting Plate - Attaches to the camera or lens to mount it on the EPIC Pro.

Camera Mounting Plate Lever - Holds the camera mounting plate securely in place. Move the small silver pin below the lever clockwise and rotate the lever clockwise to release the camera mounting plate.

Navigation panel - Contains the LCD display and directional buttons for operating the EPIC Pro Menu.

Tripod Mount - Attaches the EPIC Pro to your tripod.

Bubble Level - Measures that your EPIC Pro is level on your tripod and on the ground.

Battery Chamber - Holds the EPIC Pro battery. Turn the latch counterclockwise and pull it the battery holder away from the unit to remove it from the chamber.

Navigation Panel

LCD Display - Displays the EPIC Pro Menu.

Directional Keys - Press up, down, left or right buttons to select items in the EPIC Pro Menu, or move the camera left to right and up or down to select parameters when shooting a panorama.

Cancel Button - Cancel selections in navigating the EPIC Pro Menu.

Power/OK Button - Hold down for a few seconds to power the EPIC Pro ON or OFF, or use to select items when navigating the Menu.

Trigger cable port - Use with electronic trigger cable to actuate the shutter and cause the camera to focus if you are using auto focus.

Remote trigger port - Use with a pocket wizard or a wireless shutter release that has a 2.5mm miniplug to trigger the EPIC Pro to capture a panorama.

Battery port - Plug the power cord into the battery port to charge the battery while it is in the EPIC Pro.

1.3 EPIC Pro Features

HIGHLIGHTS

DSLR camera compatible - EPIC Pro works with almost all digital DSLR cameras introduced after 2004.

Large lenses are supported - Camera and lens combinations of up to 10 lbs can be used with the EPIC Pro.

Precision accuracy - Powered camera movement and simple fore/aft up/down adjustment for optimal positioning of the nodal point and varied camera/lens combinations.

Quick set up - Easy to secure EPIC Pro to tripod. Fits standard tripods, with 1/4" or 3/8" thread. Onboard bubble level for horizontal alignment.

Clear and simple to navigate menu - Access frequently-used functions with the touch of a button, such as to move the camera or set the shutter delay. Screen is highly visible with back lit display.

Strong and durable yet lightweight - Excellent design with magnesium chassis and aluminum arm, the EPIC Pro weighs less than 8 lbs with battery pack.

SPECIAL FEATURES

Rechargeable battery pack (7.2V, 4300mAH) included - Charge the battery on its own or while inserted in the EPIC Pro, convenient for charging while shooting. Charger included.

Multiple triggering option - Allows the EPIC Pro to take multiple pictures at each image location up to 20 times per position for exposure bracketing or multiple image enhancement.

Optimized range of motion - 360 panoramic and -65/+90 tilt range of motion with precision incremental movement.

Remote trigger port - Enables you to start taking a panorama from a different location using a remote trigger with a Canon E3 type connector. (not included).

Advanced settings include: option to repeat last panorama, pause and scroll, and order pictures as rows or columns.

Adjustable features include: time between exposures, pre trigger delay, focus assertion time (shutter length), motor speed, aspect ratio, and picture overlap.

1.4 Navigate the EPIC Pro Menu

Turn the EPIC Pro on by pressing the Power/OK button. The first menu option, 'New Panorama', will appear. To navigate to other menu options, push the down button. To reach submenus within a menu option, push the OK button once you reach the desired main menu option, then the down button to access the submenu choices. To exit a menu or submenu, push the X button.

EPIC Pro Menu Tree

New Panorama

360 Panorama

Options

- Time Per Pic
- Start Del/Trig
- Mult Shutter
- Pic Order
- Battery Status
- Factory Reset
- Expert Options
 - Checklist
 - Shutter Mode
 - Shutter Length
 - Motor Speed
 - Motors Rigid
 - Pretrigger Delay
 - Backlight Mode
 - Aspect Ratio
 - Picture Overlap
 - Quick Menu Set-up
 - Firmware Ver

Panorama Memory

- Previous
- Save Previous
- Recall

Camera Setup

Move Camera

Menu Options Glossary

Main Menu

New Panorama – Sets the upper left photo and lower right photo that defines the rectangular area of the panorama.

360 Panorama – Sets the upper pitch and the lower pitch of a panorama that is 360 degrees and completes a full circle.

Options – Contains submenus that allow you to change more settings.

Panorama Memory – Recalls a previously defined panorama or save the current panorama definition to the EPIC Pro's memory.

Camera Setup – Sets the vertical field of view for the particular lens and focal length that you are using by aligning a discernable object or point at the top of the viewfinder and then at the bottom of the viewfinder.

Move Camera – Moves the camera and lens from left to right and up and down using the directional keys.

Options Menu

Time per Pic - The amount of time that the EPIC Pro will wait until it moves the camera to the next position. It is important to allow enough time for the camera to process the current photograph and move the data to flash memory. This is the most likely reason the camera would miss a photograph.

Start Del/Trig – Enables a timer delay before each panorama capture begins.

Mult Shutter – Allows you to take multiple pictures at each position during the capture of your panorama. You can take up to 20 pictures at each position.

Pic Order – Allows for different patterns of capturing the individual photographs such as {column-right, column-left, row – down, row – up}.

Battery Status – Tells you what the voltage level of the batteries is. A voltage of 7.4 volts means that the batteries are fully charged. A voltage of around 7 volts means your batteries will not be able to operate the EPIC Pro for much longer.

Factory Reset – Resets certain options to their default values. The Camera Setup, Time per Pic, Start Delay, Mult Shutter, Pic Order, Saved Panoramas and vertical field of view will be reset.

Expert Options – Accesses the items on the expert options submenu.

Expert Options Submenu

Checklist - If this option is set to ON, a checklist of things that need to be done in order to successfully create a technically good image are presented to the user before the panorama is taken. Selecting OFF will eliminate these prompts.

Shutter Mode - Allows you to choose how the unit will operate your camera's shutter. The settings are Remote or Manual. The Remote setting will use the electronic trigger cable to connect the EPIC Pro to the remote shutter port on your camera. If the Manual method is used, the user must manually actuate the shutter and press the OK button on the EPIC Pro to advance to the next photograph.

Shutter Length - When using autofocus with difficult subjects this setting allows you to incrementally increase the amount of time that the focus signal is asserted to achieve good focus. You can set the value to {Time per pic, 0.5s, 0.6s, ..., 2.0s, 2.2s, ..., 4.0s, 4.5s, ..., 8.0s}. If the Shutter Length setting exceeds the Time per Pic setting the Shutter Length setting will be used. This allows you to fine tune the amount of time needed to achieve good focus separately from how much time your camera needs to sustainably write images to the Flash memory without filling up the cameras buffer memory.

Motor Speed - Options are Slow, Med, or Fast. It is recommended that you use the Slow setting when using large lenses to reduce the settling time after accelerating and de-accelerating a large lens.

Motor Rigid The On setting will help hold large lenses in position when you are not in a Move mode, or actively capturing a panorama.

Pre-trigger Delay {0.0s, 0.5s, 1.0s, 1.5s, 2.0s, 2.5s, 3.0s} This delay is between the EPIC Pro movements and the electronic trigger signal to your camera. This allows a lens and camera body to settle after an EPIC Pro movement. This is especially important for large and longer focal length lenses.

Backlight Mode This setting allows you to choose when the back light is in use. The options are Power Save, Always Off, Always On.

Aspect Ratio The options are 1:1, 2:3, 4:3, 16:9. The default setting is 4:3 (4 units wide to 3 units tall).

Picture Overlap {25%, 30%, 35%, 40%, 45%, 50%, 55%, 60%, 65%, 70%, 75%} This setting allows you to increase the overlap to compensate for vignetting, or poor performance of a lens at the edges of the glass. Increasing this value may help give the stitch software more common area to find control points. The EPIC Pro default picture overlap is 30%.

Panorama Memory Menu

Previous – Repeat the previous panorama. Your panorama will be lost unless you use the ‘Save Previous’ option before turning the power off.

Save Previous – Save the previous panorama settings to the EPIC Pro’s memory, including an approximate reference point that will be used in the future to give the EPIC Pro a point of reference to begin shooting.

Recall – Recall a panorama setting from the EPIC Pro’s memory that was saved using the ‘Save Previous’ option.

1.5 Set up the EPIC Pro Quick Menu

Access the Quick Menu at any time by pressing and holding the X button until the Quick Menu appears. You can choose which items appear on this menu to suit your preferences. Use the ‘Expert Options’ submenu item ‘Quick Menu Setup’ to set one of the four menu items on the Quick Menu. You have the ability to choose one of the following items for each of the four quick menu items.

Move Camera

Time Per Pic

Start Del/trig

Pic Order

Mult Shutter

Battery Status

Motor Speed

Recommended functions to add to the Quick Menu, include: Time Per Pic, Pretrigger Delay, Battery Status, and, Shutter Length.

1.6 Electronic Trigger Cable Compatibility

Your EPIC Pro arrived with seven electronic trigger cables. Review the chart below to find which cable is compatible with your camera.

Camera Model	Cable Type
Canon EOS-1Ds Mark III EOS-1Ds Mark II EOS-1Ds EOS-1D Mark IV EOS-1D Mark III EOS 1D Mark II N EOS 1D Mark II EOS 1D EOS 5D Mark II EOS 5D EOS 7D EOS-50D EOS-40D EOS-30D EOS-20D EOS-10D	Canon N3 cable
Canon EOS 1000D Rebel XS EOS 550D Rebel T2i EOS 500D Rebel T1i EOS 450D Rebel XSi EOS 400D Rebel XTi EOS 350D Rebel XT EOS 300D Rebel	Canon E3 cable
Fujifilm S3 Pro S5 Pro	Nikon ten pin cable
Nikon D3X D3S (2009) D3 (2007) D2Xs D2X D700 (2008) D300S (2009) D300 (2007) D200	Nikon ten pin cable
Nikon D100	Requires a Nikon D100 multi function grip that contains a 10 pin remote shutter connector.

Nikon D90 (2008) D5000	Nikon MC-DC2
Nikon D80 (2006) D70S D70	Nikon MC-DC1
Olympus E-620 E-600 E-520 IS E-510 E-450 E-420 E-410	Olympus RM-UC1
Pentax K7 20D K10D K200D K110D K100D Super K100D	Canon E3 cable
Sony ALPHA-A900 ALPHA-A850 ALPHA-A700 ALPHA-A550 ALPHA-A500 ALPHA-A380 ALPHA-A350 ALPHA-A300 ALPHA-A200	Sony RM-S1AM

2. Setting up the GigaPan EPIC Pro

Carefully follow the steps below to capture the highest quality panoramas.

2.1 Get your equipment ready

To start shooting panoramas with the EPIC Pro, you will need:

- EPIC Pro battery and power cord (included with the unit)
- A tripod, fitted with a standard 1/4-20 tripod screw
- Digital camera and lens (see compatible camera list at www.GigaPanSystems.com)
- Electronic trigger cable (included with the unit)
- Camera battery and/or charger
- A memory card (at least 4 GB) *Make sure you have enough memory on your memory card to take the number of pictures the panorama requires.*
- A memory card reader, or your camera's USB cable

2.2 Charge and Install Batteries

Your EPIC Pro will arrive with its battery ready to be charged. There are two ways to charge the battery – you can charge the battery while it is in the EPIC Pro or remove the battery to charge it on its own.

To charge the battery inside the EPIC Pro:

1. You can charge the battery in the EPIC Pro while it is powered on or off. You can also operate the unit while the battery is charging, if there is a sufficient level of charge on the battery.
2. Insert the battery into the EPIC Pro battery compartment until the end of the battery is flush with the opening. When the battery is inserted, flip the latch clockwise to lock the battery into place.
3. Plug the power cord into the EPIC Pro battery port under the right side of the LCD display.
4. Plug the power cord into an AC wall socket. A plug icon will appear in the lower right corner of the LCD display. When the EPIC Pro is powered off, the plug icon will not appear while the battery is charging.
5. Place the EPIC Pro level in a space that has ample ventilation.
A light on the power cord will blink red until charged. A blinking green light signals that the battery is now charged and ready to use.

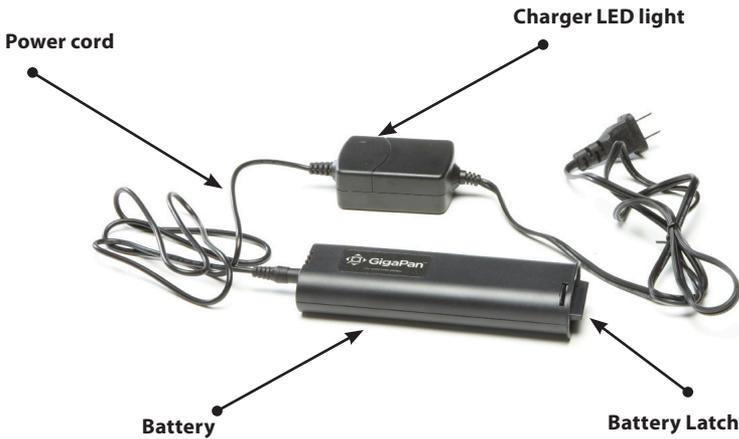
To charge the battery on its own:

1. To remove the battery from the EPIC Pro , open the battery compartment by flipping the latch counter-clockwise.
2. Plug the connector end of the power cord into the battery and then plug the power cord into an AC wall socket.
3. Place the battery level in a space that has ample ventilation.
A light on the power cord will blink red until charged. A blinking green light signals that the battery is now charged and ready to use.

To check the EPIC Pro battery status:

When the battery is low, a low battery icon will flash in the lower right corner of the EPIC Pro LCD display. When the battery is so low that proper functionality is no longer possible, a "Please recharge the battery" message will appear.

To check the battery status, press the directional keys until you reach the 'Options' menu item and press OK. Select the 'Battery Status' menu item and press OK. If the battery has just been charged, the battery status should read at least 7.4 volts. If the battery is below 7.0 volts, it needs to be charged.



2.3 Mount the EPIC Pro on a tripod

To ensure a steady series of images, use the EPIC Pro with a sturdy tripod fitted with a standard 1/4-20 tripod screw.

1. Set up the tripod. Ensure that the legs have a solid footing on the ground and that the tripod is relatively level. If the tripod has a bubble level use it to help level the tripod. Tighten the adjustment screws on the tripod.
2. Remove the tripod quick release plate and attach it to the EPIC Pro's tripod mount at the bottom.



Quick-Release Plate



Tripod Mount

3. Gently tighten the screw until the quick release plate is firmly attached to the EPIC Pro.
4. Clip the plate back onto the tripod.
5. Use the bubble level to center and level the EPIC Pro. Adjust the tripod legs and mount as necessary.



Bubble Level

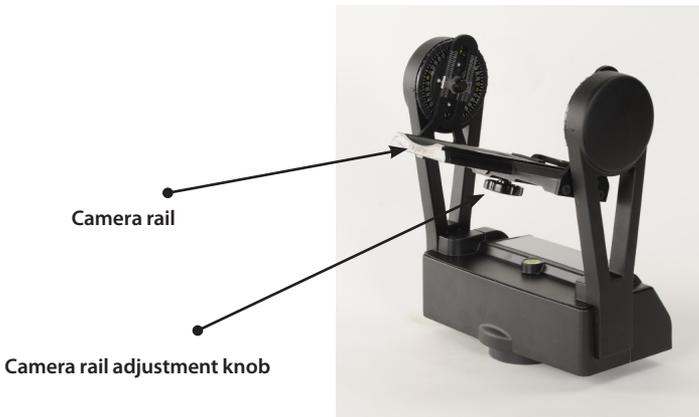
2.4 Mount your camera and lens

Use these steps below to mount your camera and lens on the EPIC Pro. Refer to the EPIC Pro diagram and part names in Chapter 1.2 as you follow these steps.

1. Turn the EPIC Pro on by pressing and holding the OK button for one to two seconds.
2. Level the camera rail by pressing the down button until the 'Move Camera' menu item is selected. Press OK.
3. Use the up and down arrows to move the camera rail to a level position, approximately even and parallel to the base of the EPIC Pro.
4. To remove the camera mounting plate from the camera rail, find the small silver pin at the front of the camera mounting plate. Turn the small silver pin clockwise and then rotate the camera mounting plate lever clockwise. Then remove the camera mounting plate.
5. Mount either the camera body or the lens mount to the camera mounting plate. Larger lenses have a mount because a camera body is not able to support the mass and size of the lens.
6. Re-attach the camera mounting plate to the camera rail with the lens and camera attached. Ensure that it is securely fastened.
7. Loosen the camera rail by turning the camera rail adjustment knob underneath the rail clockwise.
8. Slide the camera rail so that the mass of the camera and lens is centered over the axis of rotation so that the EPIC Pro can easily move the lens and is less susceptible to external forces such as wind or vibration from vehicles. If you are photographing subjects that are closer with a medium to small mass lens you may opt to adjust the lens so that the optical center is centered at the axis of rotation. This choice affects the adjustment of the rail forward or backward. It does not effect the height adjustment, which will be adjusted to the center of the lens or as close as possible.



- Adjust the rail forward to center the mass over the axis of rotation unless you are very close to your subject. If you are close to your subject you will need to use a lens that allows you to position the camera rail so that the lens is approximately at the optical center which minimizes parallax error. This position will be close to the region of the lens between the front glass element and the focus ring in most cases.
- Adjust the height of the camera rail and the camera mounting plate so that the center of the lens is at the level of the platform thumbscrews attached to the EPIC Pro arms. Loosen the platform thumbscrews to allow for adjustment of the camera mounting plate and lens height. A few larger cameras, such as the Nikon D3X, will not allow you to perfectly center the height of the lens to the midpoint. For the majority of usage, this should not be an issue.



2.6 Set up your camera

Follow the steps below to optimize your digital camera settings for panorama taking.

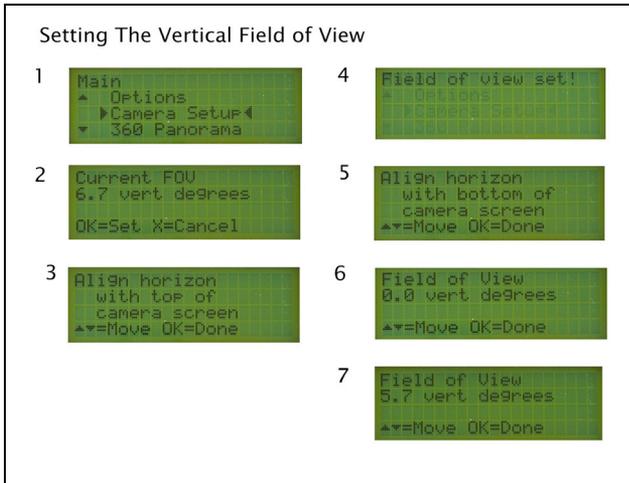
- Turn on your camera and select the 'Manual mode'.
- Adjust the focus and exposure. (ISO, aperture value, shutter speed)
- Set your camera's 'White Balance' (Daylight, Cloudy, Tungsten or Fluorescent) based on the lighting conditions. You may use a device such as an expodisc, color card, or grey card to get better white balance.
- Connect the electronic trigger cable to the trigger cable port, which is located to the left of the LCD display. Connect the cable to the camera.
- Set the EPIC Pro 'Time per Pic' in the 'Options' submenu to ensure enough time for the camera to be ready to capture another photograph. You need to account for the shutter speed and enough time to write the image to flash memory. It is important to allow sufficient 'Time per Pic' to avoid missing photos.

2.7 Align your a camera to the GigaPan EPIC Pro

Any time you change the lens, camera body, or the focal length on a zoom lens you will need to use the menu item 'Camera Setup' to tell the EPIC Pro how much your camera can see for each photograph taken. The term "Field of View" (FOV) is used for image viewers and "angle of view" is used for lenses.

By setting the angle of view, the EPIC Pro will be aligned with the specific focal length of your camera. This allows the EPIC Pro to calculate how far to move between each position to ensure the proper amount of image overlap. And, when combined with the parameters set for your panorama, the EPIC Pro can calculate the number of images to be taken.

1. To set the field of view, select the 'Camera Setup' from the EPIC Pro Menu. Re-start the EPIC Pro, if necessary, by holding down the power button. The EPIC Pro will display the current field of view.
2. Pick a discernable object or point in your scene and align it with the top of the camera viewfinder or camera LCD using the up and down keys. Press OK.
3. Move the lens using the up key until the point you selected is at the bottom of the camera viewfinder or the camera LCD screen. The EPIC Pro will provide the current field of view as you move the lens. Press OK.
4. The field of view is set! **Note:** The EPIC Pro will adjust these points to allow for a configurable overlap, you do not need to make an adjustment for the overlap. The EPIC Pro default overlap is 30%. Use the 'Picture Overlap' setting to change the overlap, if needed.



2.8 Set manual focus or autofocus

Focus is very important when capturing panoramas with the EPIC Pro. By paying close attention to the focus both before and during shooting, you can create panoramas with ultra high resolution and incredible clarity in their detail. By not paying close attention to focus, the amount of time and effort spent capturing a large 1000 photograph panorama may not generate as good of results as the same panorama using a shorter focal length and 400 photographs.

Manual Focus

Consistent Focus

The use of manual focus to capture a panorama reduces the risk of missing photos, inconsistent focus, or complete lack of focus. When you choose to use manual focus, you are assured that the focus will remain consistent over all areas of the panorama. You will also not need to be so concerned about missing an image in a large panorama. Consult a depth of field table to become familiar with the distances which will have an acceptable sharpness.

Maximize Depth of Field

Depth of field is a function of

1. Aperture - diameter of diaphragm opening. Decreasing the diameter will increase the DOF. Increasing the aperture value too much, such as $f/22$ versus $f/8$ through $f/16$ will result in diminishing returns in sharpness due to diffraction losses.
2. Focal length - distance from image sensor plane to principle point. Decreasing the focal length will increase the DOF.
3. Distance to subject - increasing the distance to the closest point that needs to be acceptably sharp increases the DOF.
4. Size of image sensor { full frame, partial frame, point and shoot } A smaller size sensor will increase the DOF.
5. Circle of confusion - diameter of circle considered to be one point. This is not a camera setting, but a definition of what is considered to be sharp. You need to pay attention to this value so that you do not misinterpret the depth of field. When the circle of confusion diameter is increased (what is considered to be one point) the standard for what is considered to be acceptably sharp decreases.

Plan your Panorama

If you have time to plan the capture of a panorama, the measuring tool on Google Earth allows you to measure the potential distances involved. Google Earth also has a tool for visualizing the lighting conditions with respect to the time of day and the date.

Auto Focus

There are situations when auto focus is a better choice, than manual focus for increasing the sharpness of a panorama. One example is a crowd of people or a building that are at an angle and span a large distance. You will not be able to increase the depth of field to cover the entire distance, especially if you are using a longer focal length. You can use autofocus to shift the center of focus closer or farther for each position in the panorama if you have a suitable situation for autofocus. There are advantages and difficulties with each method depending upon the particular situation. The 'Shutter length' setting in the 'Expert options' and using a faster lens with a minimum aperture value such as f/2.8 versus f/5.6 are two ways to make autofocus work better. Another important hardware consideration is the autofocus system of the particular camera body that you are using.

Potential subject problems

Multiple objects at different distances - may need to reduce focus points used or temporarily switch to manual focus for that region of the panorama.

Areas devoid of discernable features - need to use manual focus for entire or part of panorama. There needs to be discernable features where the camera body focus points are located.

Moving objects - May need to repeat particular photograph or pause panorama

Enough light - May need to use better equipment such as a faster lens such as f/2.8 versus f5.6. May need to use manual focus

Important auto focus camera settings include:

1. A faster lens with a lower minimum aperture value such as f2.8 versus f5.6. The aperture value is inversely proportional to the diaphragm diameter. A wider opening allows more light to hit the autofocus sensor.
2. A focus policy where a photograph is taken only if good focus is achieved versus a release policy where the photograph will be taken regardless of whether good focus has been achieved. Increase the 'Shutter Length' setting to increase the amount of time that the focus signal is asserted.
3. The auto focus mode such as single servo, continuous servo, or mixed.
4. The focus points that are selected.

With Canon DSLR cameras the auto focus mode is tied to the release or focus policy. Nikon cameras have a default release priority or focus priority which may be changed using the camera menu system.

You can use a combination of auto focus and manual focus in difficult lighting situations, such as blue sky, smooth water, or bright lights.

Test your set-up

You get the best panoramas when two consecutive pictures overlap by about a third. The best way to test whether your setup is all right is to take a 2x2 panorama. Use the instructions in Chapter 3 to take a panorama, and preview the images in your camera. If you don't see a good overlap despite following the instructions, go back and adjust your EPIC Pro set-up.

Good Overlap



Insufficient Overlap



2.9 Minimize parallax error

Use the following tips to eliminate an effect called parallax, which causes objects to appear to have shifted when viewed from different lines of sight.

Note: If the subject of your panorama is far away, you will want to adjust the position of the camera rail forwards or backwards to balance the camera and lens instead of following these tips to minimize parallax error (See Chapter 2.4 for information about balancing the mass of your camera and lens). At further distances, it is more important that your camera and lens be stable for minimizing parallax error.

Adjust the lens position

If you are capturing a panorama where the subjects include objects that are close to the lens along with objects that are farther away, you may be able to increase the image quality by adjusting the lens so that the front entry pupil of the lens is centered over the axis of rotation.

Approximate adjustments for minimizing parallax error

1. Adjust the height of the camera by loosening the two platform thumbscrews on the EPIC Pro arms. Move the camera mounting platform up or down until the midpoint of the camera lens is located at the same height as the thumbscrew and the axis of rotation for pitch (up and down).
2. Adjust the camera rail by loosening camera rail adjustment knob. Slide the rail forwards or backwards until the entry pupil of the lens is at the same position as the middle of the arm where the platform thumbscrews on the EPIC Pro arms are located. The entry pupil is now approximately aligned with the axis of rotation for yaw (left to right).

Fine adjustments to the camera mounting platform for minimizing parallax error

Note: The approximate adjustments described above are sufficient for most instances. However, sometimes it may be necessary to make the following fine adjustments and work the extra time and effort.

1. Find two objects in your scene that are adjacent to each other and at different distances, such as two trees at different distances or a window frame and a door. You will use these two objects to accurately repeat images at two angles with the camera rail adjusted at different points.
2. Place two additional objects that will help you consistently position the EPIC Pro at different angles. You might use two chairs and use the back of a chair just visible at the left side of the viewfinder to repeat two angles.
3. Loosen the knob underneath the camera rail and move the rail so that the estimated location of the lens entry pupil is located at the midpoint of the EPIC Pro arms, which is the yaw axis.
4. Determine the position of the camera rail using the millimeter markings on the rail.
5. Measure the distance between the two objects at the two angles for different positions of the camera rail.
6. When you find the position of the rail where the distance between the two objects changes the least number of pixels at the two different angles, you have minimized the parallax error for the yaw axis (left to right)

3. Using the GigaPan EPIC Pro

To shoot a panorama with the EPIC Pro, you can select 'New Panorama', '360 panorama' or select 'Previous' under 'Panorama Memory' if you have saved a previous set-up.

Remember that you will need to repeat the camera set-up instructions in Chapter 2.7 if you change lenses or focal lengths.

3.1 Start a new panorama

1. Turn the EPIC Pro on by holding down the Power/OK button.
The first menu item is 'New Panorama'.
2. Press OK to select 'New Panorama'. The EPIC Pro will prompt you through the following steps.
4. Use the directional keys to point the camera to the top left corner of your scene, and press OK when you're ready.
5. Now use the directional keys to point the camera to the bottom right corner of your scene, and press OK when you're ready.
While you're doing this, you'll be able to see how many horizontal and vertical pictures the EPIC Pro is going to take.
6. The EPIC Pro will display 'Show Panorama?' to let you preview the panorama before it begins. Press OK if you want it to, or press X to continue without a preview.
7. You'll now need to confirm if you want to go ahead with the panorama by pressing OK.
8. Watch the scene while the EPIC Pro takes your panorama.
9. If someone steps into your frame, or if your camera misses a picture, press X to pause the panorama, use the directional keys to go back to an earlier camera position and retake the photo.
10. Access the Quick Menu at any time by pressing and holding the X button until the Quick Menu is displayed.

3.2 Shoot a 360 degree panorama

Taking a 360 degree panorama is easy and is similar to shooting any other panorama. Instead of setting the EPIC Pro to the upper left and lower right corners of the panorama, you just have to set it to the top and bottom.

1. Use the directional keys on the EPIC Pro to navigate to '360 Panorama' in the menu and press OK.
2. Use the directional keys to point the camera to the top of your scene and press OK.
3. Use the directional keys to point the camera to the bottom of your scene and press OK.
4. The EPIC Pro will display 'Show Panorama?' to let you preview the panorama before it begins. Press OK if you want it to, or press X to continue without a preview.
5. Confirm whether you want to go ahead with the panorama by pressing OK.
6. Watch the scene while the EPIC Pro takes your panorama to make sure it does not miss a picture and no one steps into your frame. If so, press X to pause the panorama and use the directional keys to go back to an earlier camera position.

3.3 Repeat a previous panorama

The EPIC Pro can save the data for your previous panorama, so you can repeat it and correct it if something went wrong with your first try, or if you just want to try the same panorama with a different camera setting.

Following are different options for repeating a panorama.

To save a previous panorama for future use:

1. After finishing shooting your panorama, use the directional keys to select 'Panorama Memory' in the main menu and press OK.
2. Select 'Save Previous' and press OK.
3. To save a previous panorama, the EPIC Pro requires a reference point in order to return to the same position. Move the camera to a reference point and press OK.
4. The EPIC Pro will display 'Reference Set!' and 'Panorama Saved!'

To recall a previous panorama:

1. Use the directional keys to select 'Panorama Memory' in the main menu and press OK.
2. Select 'Recall' and press OK.
3. To recall a previous panorama, the EPIC Pro requires a reference point in order to return to the same position. Move the camera to the reference point you selected and press OK.
4. The EPIC Pro will display 'Reference Set!' and 'Taking Panorama!'
5. The rest of the process is the same as any other panorama.

To repeat a previous panorama:

It is not necessary to use a reference point to repeat the last panorama unless you physically move the EPIC Pro.

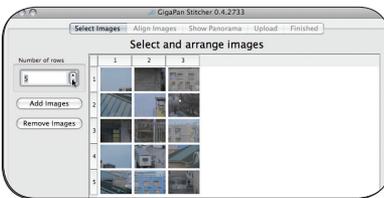
1. Use the directional keys to select 'Panorama Memory' in the main menu and press OK.
2. Select 'Save Previous' and press OK.
3. The EPIC Pro will display 'Show Panorama?' to let you preview the panorama before it begins. Press OK if you want it to, or press X to continue without a preview.
4. The rest of the process is the same as any other panorama.

4. Stitching and uploading panoramas

GigaPan Stitch software automatically takes all your photos and combines them into one big panorama. Once that's done, you can upload it to GigaPan.com for everyone to see. You'll need an Intel based Mac or PC with at least 1 GB of RAM (more is better) to stitch photos. The more powerful your computer, the less time required to stitch panoramas. To upload to the GigaPan.com site, your panorama must be at least 50 megapixels (or an average of 35 or more pictures have been stitched together in a single panorama).

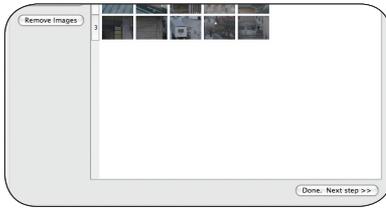
4.1 Using GigaPan Stitch Software

1. Start the GigaPan Stitch software—you'll find it under 'Start' > 'Programs' > 'GigaPan Stitch' in Windows, or under 'Applications' on a Mac. To allow GigaPan Stitch to work faster, it is recommended that you quit all other programs.
2. Click on 'Add Images'. The pictures must be in JPG format.
3. Select the photographs you took for the panorama from the folder where you've saved them on your computer. Hold down [Shift] to select many images at a time. It's all right if you don't remember the file names—just select the ones you think apply. You can remove the duplicate or extraneous ones or add more photos later.
4. The photos will appear scrambled initially. Change the 'Number of Rows' so they line up properly.



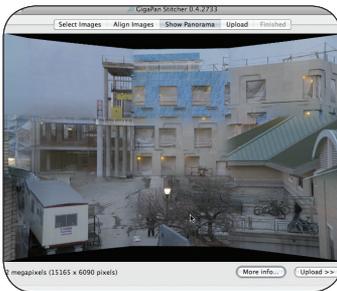
5. If you want to remove a photo, click on it and choose 'Remove Images'. To select multiple photos, click and drag the mouse over them.

Note: *GigaPan Stitch won't work unless each column has an equal number of photos.*



6. When you're ready, click 'Done'.
7. Save your panorama.
Huge panoramas can take up a lot of space on your drive—they can each take up 100 MB or more—so be sure to have plenty of free space.
8. Take a break!

Gigapan Stitch needs all your computer's power to align and blend your photographs. Allow time for this process.



9. Once your panorama is stitched, you can explore it by clicking on it and dragging it. To zoom in, use your mouse's scroll wheel. If your mouse doesn't have a scroll wheel, hold down the right button and drag the mouse to zoom in and out.
10. To save this panorama as another file type, select 'File' > 'Export stitched image to' > 'TIFF or Adobe RAW'.
11. If your panorama is larger than 50 megapixels, you can upload it to GigaPan.com where you can share, explore and take snapshots.

Additional GigaPan Stitch Options

To access these additional stitching options click on the 'Options' button on the left side of the stitching software.

Image shooting order

Your options are columns - right, columns - left, rows - down, or rows - up.

The GigaPan Stitch default is columns - right; remember to change it in the stitching software if you change your shooting order with the EPIC Pro.

Combine images in draft mode

Draft mode causes seams between images to be visible, but speeds up stitching some.

This option removes the blending step of the process, which speeds up stitching and could be useful for quickly checking what your image will look like.

Build panorama at 50% scale

Using 50% mode will cause a loss of detail, but speeds up stitching and results in a gigapan with 1/4 as many pixels as normal. This could be useful for larger images that you may be printing instead of zooming into, so the extra detail isn't necessary; or when you know that your input images are a little blurry; or if you'd like to save upload time. Keep the 50 megapixel minimum limit on uploads in mind, however. For example: if normal stitching would have yielded a 160 megapixel panorama, the '50% scale' option would generate a 40 megapixel panorama, which would be too small to upload to GigaPan.com.

Use larger blending region

A larger blending region is useful if transitions between images appear too hard-edged and abrupt.

Mercator projection instead of spherical/equirectangular

The mercator projection doesn't distort objects above or below the horizon, but cannot be used in Google Earth.

4.2 Share your panoramas online

To share your panoramas with the GigaPan community, please join www.GigaPan.com and then upload.

1. Join GigaPan.com

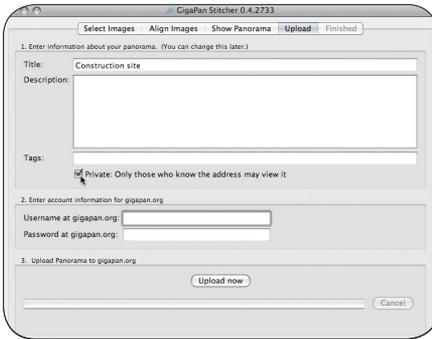
Become a member of the GigaPan community! Join GigaPan.com where you can explore thousands of panoramas from around the world. Visit today to share, explore and discover.

The screenshot shows the GigaPan website interface. At the top, there is a search bar and navigation links for 'Show me: Most Popular', 'Most Recent', 'Tags', and 'Conversations'. Below the navigation is a large panoramic image of a suspension bridge (Clifton Suspension Bridge) with many hot air balloons in the sky. A caption below the image reads: 'This is @Gigapan Clifton Bridge Avonlea Pa. Bristol Balloon Fiesta 2013 | taken by Brian Robinson (Atlanta) | Selected by jolozz as part of the August 11 collection'. The main content area is divided into three columns: 'share' (with links for 'create a free account or login'), 'view' (with a search bar and 'MOST POPULAR GIGAPANS'), and 'news & events' (with 'GIGAPAN NEWS' and a 'SUMMER SALE' announcement). The 'news & events' section includes a link to 'THE GIGAPAN EPIC SERIES' and a small image of camera mounts.

2. Upload to GigaPan.com

Once your panorama has been stitched and you're happy with it, you can upload it to GigaPan.com.

1. Give your panorama a name and a description. The more detail you provide, the more easily it will be found in searches.
2. Give it a few tags—words that describe what you've photographed. For example: Halloween, backyard, winter, and so on. You can use as many tags as you want; separate them with a comma.
3. If you want only a select few to see your panorama, check the box for 'Private'. This way, only people you give the panorama's URL to can view it.



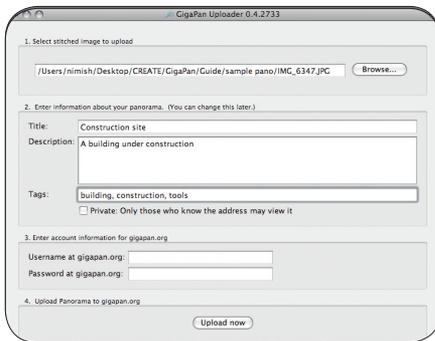
4. Enter your GigaPan.com user name and password, and click on 'Upload now'.
5. Once you have uploaded your panorama, it'll give you a URL to view it online. People can now view your panorama, zoom in and out, take snapshots of parts that they like and things they find. They can also leave comments for you. If you checked 'Private' before uploading, this is the URL you send to the people you want to share the panorama with.



Upload using third-party software

If you used a third-party tool to create your panoramas, you can upload them using GigaPan Upload software, which automatically installs with GigaPan Stitch.

1. Start the GigaPan Uploader ('Start' > 'Programs' > 'GigaPan Uploader' in Windows, or under 'Applications' on a Mac)
The interface of the Uploader is identical to the Upload screen in the stitching software.
2. Click 'Browse' to select the panorama you want to upload.
3. Give your panorama a name and a brief description.



4. Give it a few tags—words that describe what you've photographed.
5. If you want only a select few to see your panorama, check the box for 'Private'. This way, only people who give the panorama's URL to can view it.
6. Enter your GigaPan.com user name and password, and click on 'Upload now'.
7. When the upload is complete, you will receive a URL to view your panorama online. People can now view your panorama, zoom in and out, take snapshots of parts that they like, and leave comments for you. If you checked 'Private' before uploading, this is the URL you send to the people with whom you want to share the panorama.

5. Exploring GigaPan.com

Enjoy thousands of brilliant gigapixel panoramas from around the world. Share, discuss, snapshot and more.

5.1 View and Share

At GigaPan.com, you can:

- Explore thousands of GigaPans from around the world, take snapshots, comment and share.
- Discover amazing ways GigaPans are being used to communicate, promote, document and provide an amazing new vision.
- Learn how to create your own GigaPans, and embed them on your website.

The GigaPan™ process allows users to upload, share, and explore brilliant gigapixel panoramas from around the globe.

Share me: [Add Photos](#) [Mail Friends](#) [Tags](#) [Comments](#) [Login](#)

share
[create a free account](#) or [login](#)
 Join the GigaPan community. Share and discover amazing gigapixel images. Comment on and take snapshots of GigaPan images. Upload your own GigaPan images to view and explore. [Learn More](#)
 Inspire your website or blog with a brilliant GigaPan image.
 Love exploring panoramas? Share with others! Embed exportable GigaPan images in your website or blog. [Learn More](#)

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 MOST POPULAR GIGAPANS

[Golden Gate Bridge](#)

news & events
 GIGAPAN NEWS
 GigaPan loves the support of our fans at the [International Association of Professional Photographers \(IAPP\)](#). Enter the IAPP's upcoming [photo contest](#) - more than \$5,000 in cash and product prizes, including a GigaPan Epic.
SHAWNEE SALE - GigaPan Epic now only \$299
 Make last Epic Summer Travel, adventure, vacation - capture your summer with the brilliant detail of a GigaPan. Small and lightweight, the Epic goes where you go, capturing gigapixel panoramas with a broad range of small digital cameras. Offer expires 8.31.09.
 Visit GigaPan on our official [Facebook](#) page! Come to get ideas, tips, learn about new developments and contribute. We would love to hear from you.
 Embedding is now easier than ever! Embed your gigapixel panoramas on websites and blogs, including the ability to zoom into incredible detail. See embedded GigaPans at

5.2 Embed your panorama

You can easily embed your panoramas on another website with all the functionality of the GigaPan Viewer to pan and zoom.

1. Log-in to GigaPan.com, and select 'My Home' to view your panoramas.
2. Choose a panorama, and click on the 'Embed' link below it to access the Embedding Wizard.
3. The Embedding Wizard provides a list of customizable features that will automatically generate the appropriate HTML code for embedding a panorama.
4. First, select an initial view. Select 'Entire Panorama' option to embed your entire panorama just as it appears on GigaPan.com.
5. Or, select 'A Specific Snapshot' to have the embedded panorama load pre-zoomed to a snapshot of your choice. If you select 'A Specific Snapshot', click on the desired snapshot and its ID number will appear above its title and description. Enter the ID number in the text field.
6. To include additional snapshots in your embedded panorama, simply click on the desired snapshot and its ID number will appear above its title and description. Enter the snapshot ID number in the text field.
7. If you choose to include multiple snapshots, separate each ID number with a comma. (Note: the order in which you enter the snapshots will be the order that they will appear in your embedded panorama, and can be ordered however you'd like.)
8. You can include up to ten snapshots in your embedded panorama.
9. Once you've used the Embedding Wizard to customize your embedded panorama, click 'Generate HTML'. Copy the HTML code and paste it into your website. To preview your embedded panorama, click 'View Now'.
10. Additional options for embedding your panorama:
 - You can choose to hide the navigation controls affixed inside the viewer (Note: a user can still navigate the panorama using keyboard controls).
 - You can also choose to have your panorama's title (in white text on a blue background from GigaPan.com) displayed above the GigaPan Viewer. The title also serves as a link to your panorama's URL on GigaPan.com. If you choose not to display the title, the 'GigaPan' watermark is also a link to GigaPan.com.

To embed a panorama owned by someone else, please contact the author for permission and a copy of the embed code. Click on the author's name to view his or her profile, and select 'Send a message'.

5.3 Place your panorama on Google Earth

Share your panoramas with the world in Google Earth. Recording your panorama's location using GPS will make it easier. You'll need Google Earth 4.2 or higher to share your panoramas. You can download Google Earth from <http://earth.google.com>.

1. Log into GigaPan.com and go to 'My Home'. For the panorama you want to place on Google Earth, click on 'Place this Panorama in Google Earth'. You will be prompted to download a file called gigapan_placement.kml. (Some browsers will download this file automatically)



2. Save gigapan_placement.kml to your hard disk.
3. Open gigapan_placement.kml in Google Earth. You will most likely see your GigaPan hover in mid-air.



4. Leave Google Earth open, and go back to your browser window.
5. Choose 'Share this Gigapan with others using Google Earth'.

7. There are three ways for you to specify the location of your panorama:
 - a. If you recorded your coordinates using a GPS receiver, enter them in the text boxes below the map.
 - b. If you know the address that you took the panorama from, click on the 'Have an address?' link, enter the address in the text box, and choose 'Go there'.
 - c. If you have neither GPS co-ordinates nor and address, click and drag the map till the crosshairs are directly above the spot you took your photo from. Use the + and - buttons to zoom in and out of the map respectively.



A

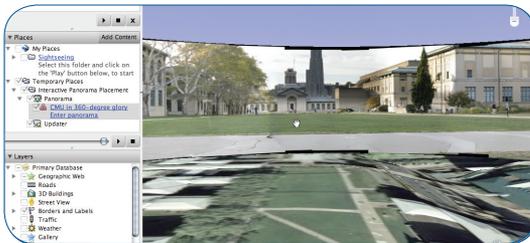


B



C

If you switch back to Google Earth, you'll see that these changes are made immediately.

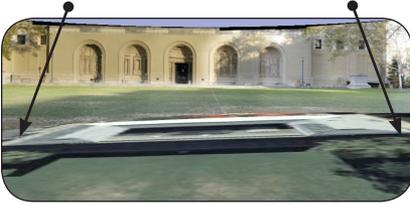


8. In Google Earth, double-click on your panorama to enter it.

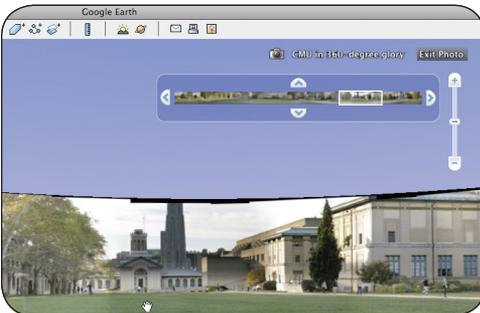


9. In your browser window, drag the 'Elevation' slider to the left to bring the panorama closer to the ground. Use Google Earth to judge your accuracy.
 Note: *Google Earth doesn't accept zero as a value for elevation.*

10. Drag the 'Heading' slider to change the orientation of the panorama. For accurate results, try to match elements in your panorama with corresponding elements on the ground in Google Earth.



11. If your panorama still doesn't look right, click on 'advanced placement options'.
12. Drag the 'Image plane' slider to bring the panorama closer to the camera.
13. Drag the 'Image floor' slider to match the horizon in the panorama with the horizon in Google Earth.
14. If you took your panorama at an angle, use the 'Camera tilt' and 'Camera roll' sliders to rotate the panorama.
15. Tweak these settings till you're satisfied.
16. When you're done, click on 'Save Changes'.
17. To exit your panorama in Google Earth, click on 'Exit Photo'.



6. Troubleshooting

Read on to find out how to fix common problems with the GigaPan EPIC Pro. If you don't find your solution here, contact technical support at GigaPanSystems.com.

6.1 My photos are blurry

There could be several causes for blurry photos:

1. The EPIC Pro might be moving before your camera has captured the photograph.
 - a. Navigate to 'Options' > 'Time Per Pic' in the EPIC Pro menu.
 - b. Use the directional keys to increase the time that the EPIC Pro will wait before moving. This is especially useful for nighttime panoramas.

2. The moving EPIC Pro platform might not have sufficiently settled before the photograph is taken.
 - a. Navigate to 'Options' > 'Expert Options' > 'Pretrigger Delay' in the menu.
 - b. Set the 'Pretrigger Delay' to a higher value to allow for more settling time.
 - c. Navigate to 'Options' > 'Expert Options' > 'Motor Speed'
 - d. Set the 'Motor Speed' to 'Med' or 'Slow' to allow for more settling time.
 - e. Shoot a test panorama while watching for settling through the camera viewfinder. If more settling time is needed, pause the panorama by pressing the X button and then adjusting the 'Pretrigger Delay' using the Quick Menu. (See Chapter 1.5 or instructions on programming 'Pretrigger Delay' in the Quick Menu).

Note: When you are using larger and heavier lenses it is especially important to adjust the 'Pretrigger Delay' and 'Motor Speed' settings.

3. Wind gusts or vibration might have disturbed the lens and camera.
 - a. Use a faster shutter speed that is at least the reciprocal of the lens focal length. If you are using a 300mm lens, then attempt to use a shutter speed that is at least 1/300th of a second. Consider increasing the ISO to allow for a higher shutter speed if there is not enough light.
 - b. Attempt to shield the lens and EPIC Pro from the wind by placing it to the side of an object such as a tree, car trunk, or a large collapsible portrait reflector. In extreme conditions, consider placing the EPIC Pro inside of a small camping tent.
 - c. Consider taking two or three photographs per position at the same exposure to increase the probability that one of the photographs is not blurry if the disturbance is intermittent.

4. Auto focus may not be yielding consistently focused images.
 - a. Navigate to 'Options' > 'Expert Options' > 'Shutter Length' in the EPIC Pro Menu. Increase the value of the 'Shutter Length' setting to a value greater than 'Time per Pic' to permit the autofocus sub system longer to achieve good focus.
 - b. If you have a faster lens (lower minimum aperture value such as f/2.8) consider using this lens. Note that a zoom lens will normally have two values printed on the lens. A

minimum effective aperture at the shortest focal length and then a slower effective aperture at the longest focal length.

c. Consider using manual focus or a mixed manual focus and auto focus approach with areas such as sky, water, plain walls that do not contain detailed features.

(See Chapter 2.8 for more information on auto focus)

6.2 My photos have a narrow depth of field

There are several factors that affect the depth of field. You can increase the depth of field on your camera by:

- increasing the aperture value
- decreasing the focal length
- increasing the distance to your subject
- using a smaller size image sensor
- using auto focus to shift the critical focus if appropriate

You can also consult a depth of field chart provided by your lens manufacturer.

There is a point at which you will experience diminishing returns in image quality while increasing the aperture value to maximize the depth of field. The image will begin to be degraded by diffraction losses if you use too high of an aperture value such as $f/22$ versus $f/8$, $f/11$ or $f/16$.

You may be able to use auto focus to increase the sharpness of your panorama depending upon your subject, available light, lens, and camera. Using auto focus allows you to move the critical focus for each position in your panorama. (See Chapter 2.8 for more information on auto focus)

6.3 My camera is missing pictures, or the first exposure

There could be several causes for your camera to miss pictures:

1. The EPIC Pro's platform is moving faster than your camera can take pictures.
 - a. Navigate to 'Options' > 'Time per Pic' in the EPIC Pro Menu.
 - b. Use the directional keys to increase the time that the EPIC Pro will wait before moving.
2. While using auto focus you did not focus the lens before starting your panorama.
 - a. Press the shutter button on your camera halfway to engage the focus system and achieve good focus before starting your panorama.
3. Autofocus is not achieving focus and not taking pictures.
 - a. Navigate to 'Options' > 'Expert Options' > 'Shutter Length' in the EPIC Pro Menu. Increase the value of the 'Shutter Length' setting to a value greater than 'Time per Pic' to permit the autofocus sub system longer to achieve good focus.
 - b. If you have a faster lens (lower minimum aperture value such as $f/2.8$) consider using this lens. Note that a zoom lens will normally have two values printed on the lens. A minimum effective aperture at the shortest focal length and then a slower effective aperture at the longest focal length.
 - c. Consider using manual focus or a mixed manual focus and auto focus approach with areas such as sky, water, plain walls that do not contain detailed features.

6.4 The electronic trigger cable is not actuating the camera shutter

There are a few common reasons why the electronic trigger cable might not be actuating the camera shutter.

1. Ensure that the electronic trigger cable is connected to the camera body and to the EPIC Pro on the left of the LCD display.
2. Verify that a memory card has been inserted into the camera and that it is not full.
3. Verify that the camera is powered and that there is sufficient charge on the EPIC Pro battery to complete a panorama. (See Chapter 2.2 for checking battery status.)
4. If you plan on using manual focus, verify that the lens is in the manual focus mode.
5. If you plan on using auto focus, ensure that you are able to achieve focus by pressing the shutter button half way to engage the auto focus sub system. (See Chapter 2.8 for more information on auto focus)

6.5 The electronic trigger cable is not allowing the camera to autofocus

1. Navigate to 'Options' > 'Expert Options' > 'Shutter Length' in the EPIC Pro Menu. Increase the value of the 'Shutter Length' setting to a value greater than 'Time per Pic' to give your auto focus sub system longer to achieve good focus.
2. If you have a faster lens (lower minimum aperture value such as $f/2.8$) consider using this lens. Note that a zoom lens will normally have two values printed on the lens. A minimum effective aperture at the shortest focal length and then a slower effective aperture at the longest focal length.
3. Check the servo mode or release policy of the servo mode. Different camera manufacturers use different terms for the servo modes. Typically a single servo mode uses a focus policy where the camera will not actuate the shutter unless the auto focus system communicates that a good focus was achieved. On some cameras you can change the default focus policy to a release policy where the photograph will be captured regardless of whether the camera achieves good focus. Continuous servo modes typically have a default policy of release where the trigger will be actuated regardless of the whether the camera achieved a good focus. Release policy can cause more problems than it solves depending upon your equipment and the subject you are photographing.
4. Consider using manual focus or a mixed manual focus and auto focus approach with areas such as sky, water, plain walls that do not contain detailed features.

(See Chapter 2.8 for more information on auto focus)

6.6 My panoramas are distorted or misaligned

There could be several causes for distorted or misaligned panoramas:

1. Check your setup for errors.

- a. Go through the Set-up steps in Chapter 2.

Note: Remember that you must repeat this every time you change the camera, lens or focal length.

- b. Make sure that your camera is tightly mounted on the EPIC Pro unit.
- c. Make sure that the EPIC Pro is firmly mounted on your tripod.
- d. Make sure that your tripod is on steady ground.
- e. Make sure that nothing disturbs the EPIC Pro while it's taking photographs.

2. Make adjustments for vertical or horizontal lines in your panorama.

GigaPan Stitch aligns the larger elements of photos, and thus might ignore vertical or horizontal lines such as poles and window frames.

- a. Try to avoid taking panoramas with too many vertical lines in the foreground.
- b. Try using a third-party tool to stitch your panorama.

3. Check and adjust the platform's forward-back position.

If you're taking macro panoramas (that is, really close to the subject), you'll need to adjust the position of the platform,.

- a. Turn to Chapter 2.9: Reduce Parralax Error. **Note:** *This is a time-consuming process, and should only be used when necessary. However, it may be necessary for panoramas that have subjects that are both close and far away, and macro panoramas.*

6.7 My computer freezes while GigaPan Stitch is working

The GigaPan stitching software needs a lot of processing power to stitch panoramas, and will use up nearly 100 percent of your CPU, leaving little for other programs. In addition, larger panoramas need more power, and take more time. So while it might appear that your computer is frozen, it's just GigaPan Stitch working hard. Ideally, you should avoid work ing on your computer while the stitching software is running.

To monitor GigaPan Stitch in Windows, turn on the Task Manager ([Ctrl] + [Shift] + [Esc]). If GigaPan Stitch reports "Not Responding", use the 'report a bug' feature under the 'help' tab of GigaPan Stitch or contact tech support via GigaPanSystems.com.

On the Mac, you can monitor GigaPan Stitch using the Activity Monitor ('Applications' > 'Utilities' > 'Activity Monitor'). If GigaPan Stitch reports "Not Responding", use the 'report a bug' feature under the 'help' tab of GigaPan Stitch or contact tech support via GigaPanSystems.com.

6.8 My panoramas have vignetting

Vignetting is the result of less light reaching the edges and corners of a photo than the center of a photo. Vignetting manifests itself as a pattern of stripes in a panorama. You can adjust camera settings to minimize vignetting and you can reduce vignetting using an image editor before stitching the photos together.

Methods of minimizing vignetting while capturing photos

1. Reduce the diameter of the camera's diaphragm by using a larger aperture value such as f/8 versus f/4. The aperture value is inversely proportional to the diameter of the diaphragm opening.
2. Use a smaller focal length such as 200mm versus 400mm.
3. Use a petal type lens hood or no lens hood.
4. Newer Nikon and Canon cameras have vignetting compensation settings that help reduce vignetting for supported lenses. Nikon vignetting correction controls are located in the custom function menu. Newer Canon cameras support 'peripheral illumination' settings for certain lenses.
5. Increase the amount of overlap to an percentage higher than the EPIC Pro default of 30% using the 'Picture Overlap' setting in the EPIC Pro Menu.

Post processing photographs to remove vignetting before stitching

At times you may need to rely on editing your photos in post-production because your camera adjustments during the capture of the panorama were not enough to eliminate vignetting or the settings would have prevented you from capturing the images due to low light conditions. Note that you are able to adjust jpeg format images to minimize vignetting, but you are able to make a more aggressive adjustment to files that are in the camera RAW format.

7. Tips and tricks

Here are some tips and tricks to make the most of your panoramas. Also, check out the creative ideas and advanced tips to go beyond the basics with your shots.

Shoot more than you need

Always take a larger panorama than you need. Because stitched panoramas are rarely rectangular, you will need to crop your panorama to print it out. This could lead to a lot of lost information, especially at the boundaries.

Another good idea is to set your lower-right corner so that it's just after the point when the number of horizontal and vertical photos increases. For example, if the EPIC Pro shows you 20 horizontal and 10 vertical images, move it lower and to the right so that it reads 21 horizontal and 11 vertical.

What you need

What you should shoot



Shooting in different environments

1. Outdoors



Try these tips settings for photographing huge vistas:

1. Examine the scene to identify what will make your panorama interesting and aesthetically pleasing, such as framing, colors, symmetry, perspective, textures, etc. Take a few individual photographs to assess exposure and contemplate the rectangular boundaries of what you want to capture.
2. Gigapan panoramas usually cover a larger area, which means that you will need to learn to make choices about exposure and focus.
3. Choose an appropriate focal length for your needs. You need a longer focal length such as 300mm to be able to see details that are far away, but changing light conditions or weather changes may require a shorter focal length such as 50mm to decrease the capture time.
3. Focus on an important element of the scene and manually set the focus.
4. Focus on an element that isn't too bright or too dark, and manually set the exposure. Use a lower ISO if possible to reduce image noise.
5. Set your camera's White Balance to either Sunlight or Cloudy, depending on the weather. Do not leave it at Auto. Use an Expodisc, color card, or grey card to set a custom White Balance.
6. Make sure that the sun is behind you. If this isn't possible, hide the sun behind an object. If you photograph into the sun you greatly increase the contrast and range of exposures necessary to capture the scene.
7. If you are using a larger lens, ensure that you set 'Motor Rigid' to 'On' and 'Motor Speed' to 'Med' or 'Slow'. Also, set the pretrigger delay to a value great enough to allow the lens to settle after the EPIC Pro moves and before actuating the shutter.
8. If there is substantial wind gusts, consider placing the EPIC Pro and lens behind a car trunk, tree, building, or a collapsible portrait reflector. Use a higher shutter speed that is at least the reciprocal of the focal length such as faster than 1/300 of a second for a 300mm lens.

2. Indoors



Try these tips settings for shooting indoors:

1. Examine what you are photographing to determine the framing, symmetry, color, perspective and texture that will give you an aesthetically pleasing or interesting panorama. Take a few photographs to help you evaluate exposure. It is important to determine the most important elements of the panorama so that you can make good choices before you concentrate on the details necessary for a successful capture.
2. Indoor scenes may have mixture of lighting types. Set your camera's White Balance so that it matches the type of light that illuminates the most important part of your panorama. Set the White Balance to Daylight, Tungsten, or Fluorescent. You may use an Expodisc, color card, or grey card to set a custom White Balance.
3. Parallax error will be more of an issue if the indoor subject is close to your camera lens. Consider using a shorter focal length such as 50mm to 100mm so that you are able to adjust the lens to a minimum parallax point instead of centering the mass of the camera and lens. The height will always be set to the center of lens if possible. Move the lens forward or backwards so that the end of the end of the lens between the focus ring and the edge of the first glass element is at the axis of rotation. A 50mm to 105mm might be a good range of focal lengths to choose from. (See Chapter 2.9 for more information on reducing parallax error)
4. Depth of field will be less as well because you are closer to your subject. Using a higher aperture such as $f/11$ instead of $f/8$, and a lower focal length will help increase the depth of field. Another option with the EPIC Pro is to use autofocus if the subject is suitable. (See Chapter 2.8 for more information about autofocus.)
5. If there are objects that are moving, you may want to use a higher ISO such as 400 or 800 to be able to use a faster shutter speed to freeze movement.

3. Night shots



Here are a few tips for shooting panoramas at night. The key is to increase the exposure time for each photo and make sure that the EPIC Pro and your camera are free from vibrations.

1. If your camera body or lens has Image Stabilization, turn the feature off. Nikon refers to image stabilisation as VR vibration reduction.
2. If your subject is located in an urban setting, set your camera's White Balance to about 2900 Kelvin, or Tungsten if your camera does not have a Kelvin setting. Often urban settings include low pressure sodium or similar lighting which will cause your images to appear a burnt orange color. If you are located in a non-urban setting you will need to set your camera's White Balance to Daylight and a much longer exposure.
3. Increase the exposure setting for your camera. Preview the effect in the camera's screen until you're satisfied. Expect exposure times of about 15 seconds to 30 seconds at ISO 100 or 200 unless there is ample illumination.
4. A lower ISO setting will reduce image noise. The highest useable ISO depends on the camera body that you are using. Typically full frame sensors for newer cameras allow you to use higher ISO settings to reduce the capture time without introducing significant noise.

4. City scenes



In cities, you need to be more aware of objects in motion—specifically vehicles and people. You may also find that buildings can get distorted when you stitch your panorama.

To avoiding moving objects, watch for people or street traffic that might get in the way of your shots - pause the panorama before they do and resume the panorama after they have left the frame, or pause go back and resume where you left off. This may not always be feasible, so you can also retake the shot where the moving object got in the way and insert it into your image in using image editing software. Remember to remove any extra images you shoot before stitching.

A few tips if you're shooting buildings:

1. Try to get as far from the building as possible to capture the full building.
2. Instead of facing the building, shoot it from a 45° angle for a unique perspective.
3. Make sure that the corner of the building is at the center of your scene.

Create Games: Hide & Seek

Make your panorama fun to explore by hiding interesting objects, and create a list of these things for your friends to find.

You can either hide items in your scene before shooting the panorama, or insert images into your panorama using image editing software.

Just follow these instructions when you are uploading your panorama to turn it into a fun hide & seek game:

1. When you upload your panorama to GigaPan.com, click on 'Edit'.
2. Check the 'Is a Game' box.
3. List the objects you've hidden in your panorama comments.



Panoramas in Motion: Capturing a Crowd

Sporting events, races or crowds of people are great opportunities to take an epic shot that captures every detail of the moment. You'll be sure to capture every face in the crowd.



When shooting a panorama of a sporting event that has a lot of motion, capture the whole scene and crowd, and then re-shoot the areas in motion individually. Drop these individual shots into the final panorama during post-production and you won't have any "ghosts" or missing people.

Also, set your tripod above the crowd or at an elevated level to capture the full scene.