

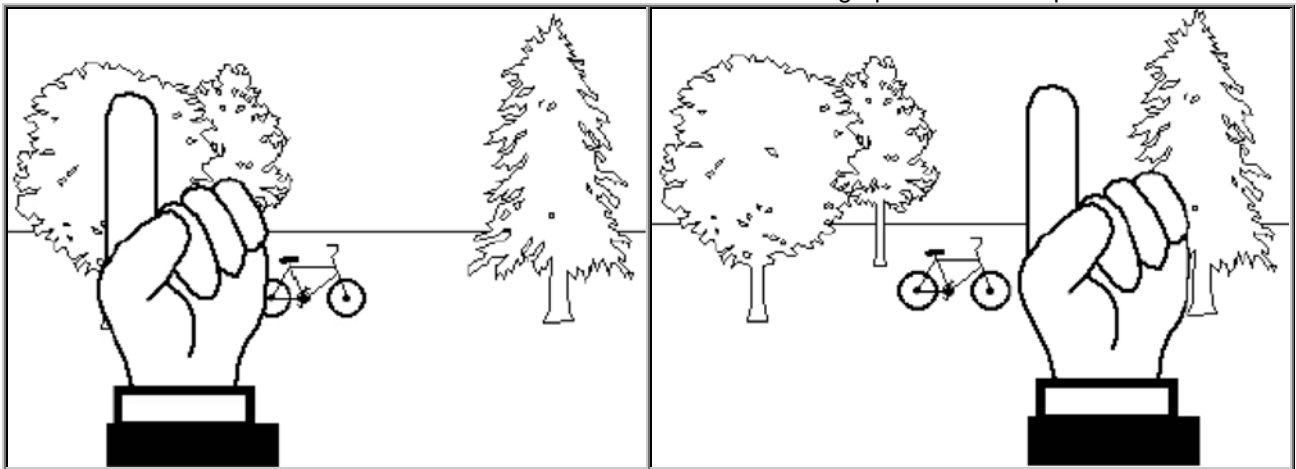
How to find your camera's nodal point

This is one of the most frequently asked questions when it comes to panorama creation. Once you understand the basics, you'll be able to easily locate the nodal point for any camera and lens combination.

Simply put, the nodal point is the point inside your camera where the light rays converge and flip over. When shooting a panorama it's necessary to rotate about this point to eliminate the image mismatch caused by parallax error.

It's also worth noting that the nodal point is not the same as the film plane, which is often marked on the underneath side of many 35mm cameras. Generally, for most 35mm cameras and lenses, the nodal point is located somewhere towards the center of the lens barrel.

Parallax error can be easily demonstrated by this simple experiment. Close one eye and hold your index finger upright about six inches away from your open eye. Rock your head from side to side. Notice how your finger moves with respect to the background. This relative movement is due to the fact that you're not rotating your head around your eye's nodal point, which is somewhere in the center of your eyeball. Instead, you're rotating about your spine which is several inches to the rear and off to one side. It is this relative side-to-side motion that we will strive to eliminate when setting up a camera for panoramas.



STEP 1: THE EASY PART - THE SIDE-TO-SIDE ADJUSTMENT

Once your camera is fastened to your pan head, move to the front of the unit so you're looking into the lens. The center of the lens should be directly over the pivot axis of the pan head. Adjust the side-to-side adjustment so the lens is centered over the pivot.

STEP 2: THE SLIGHTLY HARDER PART - FORE-AFT ADJUSTMENT

This step is most easily accomplished out of doors. Find a vertical edge or line, such as a doorway or edge of a building. Position your camera and tripod about two feet away, or as close as possible with the edge still in focus when you look through the viewfinder.

Looking through the camera's viewfinder, find another vertical edge or line that is far away, such as another building or telephone pole. Align the two objects and rotate the pan head so they are in the left hand side of the viewfinder.

Rotate the pan head so the two objects move over to the right hand side of the viewfinder. Unless you've managed to unwittingly locate the right position, you should notice the two objects will move with respect to each other as you rotate the pan from left to right. Slide the camera to the front or rear as required to eliminate this relative movement.

It may help to first locate the camera all the way to the front or rear and then move it a little bit at a time. This way you'll more readily see the parallax effect and notice how it improves as you slide the bracket.

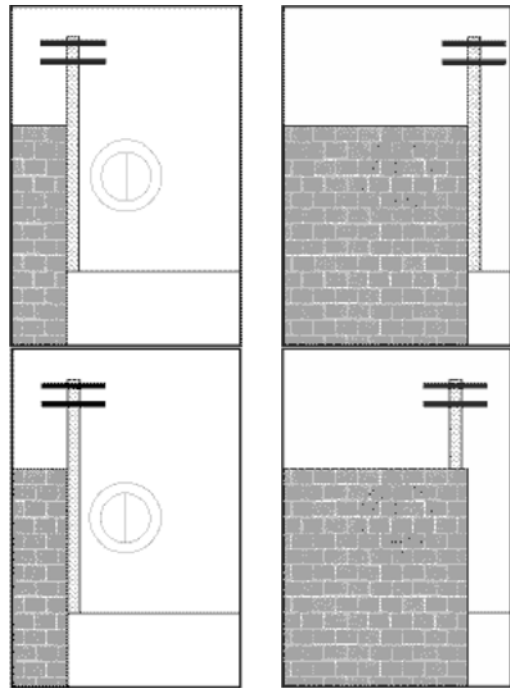
STEP 3: LEVEL THE CAMERA

Once you have located the fore-aft position, you now must level the camera. If your camera has a flash hot shoe, you can use a bubble level designed to slide into the shoe. You should be able to get these at a

good photographic supply store. If your camera does not have a hot shoe, then you'll need to level the camera another way. If the camera has a flat, level surface, then you can use a bubble level. You should be able to locate a small level at a hardware store. If there are no level surfaces, then you may have to resort to "eyeballing".

Looking through the viewfinder, align a close object (brick wall) with a faraway object (telephone pole). As you rotate the camera from side-to-side there should be no relative movement between the two objects as shown to the right.

If, as shown to the right, the two objects move with respect to one another in the viewfinder, slide the camera fore or aft in order to eliminate this movement. Here, the telephone pole has moved behind the brick wall.



STEP 4: RECORD YOUR RESULTS

After you've discovered the two location dimensions, be sure to record the settings. The QuickPan camera bracket has a convenient indicator scales for this purpose. These numbers represent the nodal point for this given camera and lens combination. If you change cameras or lenses, this procedure may have to be repeated.

STEP 5: HOW ABOUT RANGEFINDER CAMERAS?

A rangefinder camera is a camera where you look through a separate viewfinder and not through the actual lens. The process is basically the same. Locate the Side-to-Side adjustment as discussed in Step 1. When it comes to the Fore-Aft adjustment, you won't be able to look through the viewfinder to determine the proper setting since the viewfinder is a separate optical path that doesn't really "see" the same image as the film. Instead, you'll have to start with the bracket all the way to the front and take pairs of test shots. Each pair will have the vertically aligned objects in the left and then the right side of the viewfinder. After each pair of photos, slide the bracket rearward and repeat the process. Slide the bracket the same increment each time (i.e. 10mm). Be sure to record the scale setting for each pair of images. Process the film, or in the case of digital cameras, download the images to your computer. At the end of this process you will be able locate the pair of images with the least relative movement. If no single image is optimum, you may need to interpolate between two images to find the closest value.