

Auto AF Fine Tune Procedure That Works on Nikon D5/D500 Cameras

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Much has been said about the convenience of the new Nikon auto AF Fine Tune function but its accuracy has also been called into question. I have spent two days fully characterizing the new function and coming up with a procedure that will give you accurate AF fine tune values. A big part of the problem is that there is as much as a plus or minus 5 point shot to shot variance in AF fine tune values due to the inherent inaccuracy of having the AF sensor in a completely different place than the sensor that the lens is supposed to be focusing the image on. In a DSLR that is being shot in its normal reflex mode, that is NOT in live view mode, a small percentage of the light that passes through the lens is transmitted through the mirror. This light is then bounced off of a secondary mirror to the autofocus sensor array, typically somewhere in the bottom of the camera. This is where the AF data is taken and a signal is then sent to the lens to adjust its focus point to where this AF sensor array thinks the optimal focus setting is.

There are inherent inaccuracies in doing autofocus this way due to manufacturing tolerances in the light path to the AF sensor and the light path to the imaging sensor which are different. Live view does not have this inherent inaccuracy since AF is done on the sensor itself. So, when doing normal off sensor Phase Detection Auto Focus, which is what the normal AF module is doing, these tolerances plus moving parts in the whole camera/lens system will have shot to shot differences.

The fundamental flaw of the new Automatic AF Fine tuning, as Nikon has implemented it, is that it takes a single shot to determine the AF Fine Tune value which could be as much as 10 points off due to the plus or minus 5 point shot to shot variance. When somebody that knows how to perform an accurate autofocus fine tune does a manual tuning procedure, they take several shots to obtain a median or average value based on the shots taken. We can do the same with auto AF Fine tune. Here is the procedure - it should only be performed with the camera mounted on sturdy tripod and the head locked down:

1. Set up a high contrast focus target. The downloadable and printable target for the FoCal AF software (which I don't currently recommend) is a great target for this purpose. Print it, or another target and tape it to a perfectly vertical surface such as a wall. Now perfectly align the camera both in height and tilt to the target so that the sensor is perfectly parallel to the camera's sensor. You can also utilize the LensAlign II target if you own this as it has a simple to use target alignment system. The camera should be about 25 times the focal length away from the target for general use or at the distance that you do your shooting at if you are in a controlled environment such as a studio.

2. Now put the camera in live view and focus the image with the focus target in the center. Now initiate the auto AF Fine Tune system by hitting the Focus selection button on the lower left of the lens mount (with you standing behind the camera) and the movie record button (small red button next to the shutter button) simultaneously and hold until the screen asks you to confirm that the camera is steady. Select yes and a value will be entered in the AF Fine Tune table.

Now go to the AF Fine Tune menu item at the bottom of the first page of the Tools Menu

(wrench icon), make sure that AF Fine Tune is set to On and then read out the value that was entered in the Saved Value item. Write this value down.

3. Repeat the same procedure as in number 2 above 9 more times for a total of 10 samples. Write all of them down.

4. Now cross out the lowest value (the most negative if a negative number) and the highest number (the least negative number if the highest number is also negative) to get rid of any weird outliers. Next, take an average of the remaining 8 values by adding them up and dividing by 8. Round this to the nearest whole number and enter this value in the Saved Value line item of the AF Fine Tune menu.

5. Repeat the above for every lens and every lens/teleconverter option. On zoom lenses, use a focal length at or near the longest focal length unless you do not use your lens at that focal length.

Here is an example of a 200-400 f/4G lens that I just fine tuned on a D500. I first manually did it and came up with a value of -2. The following AF Fine Tune values were obtained using the auto AF Fine Tune procedure 10 times:

-1, +3, -3, -2, -2, -3, -4, -1, -5, -1, -3

Throwing out the highest and lowest values (+3 and -5) and then averaging the rest gives a result of -2.37. Rounding that to the nearest integer, you get a value of -2 which is identical to the value I came up with.

I have repeated the above on many different lenses and in every case the procedure and my manual method was either identical or within one point of each other. One point difference is well inside the shot to shot error and is inconsequential.