



FOCUS

How it works, What affects it, Focus Modes,
Focus Points, Live View, Depth of Field,
Hyperfocal Distance, Drive Modes
Other Stuff

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Phase Detection AF vs. Contrast AF

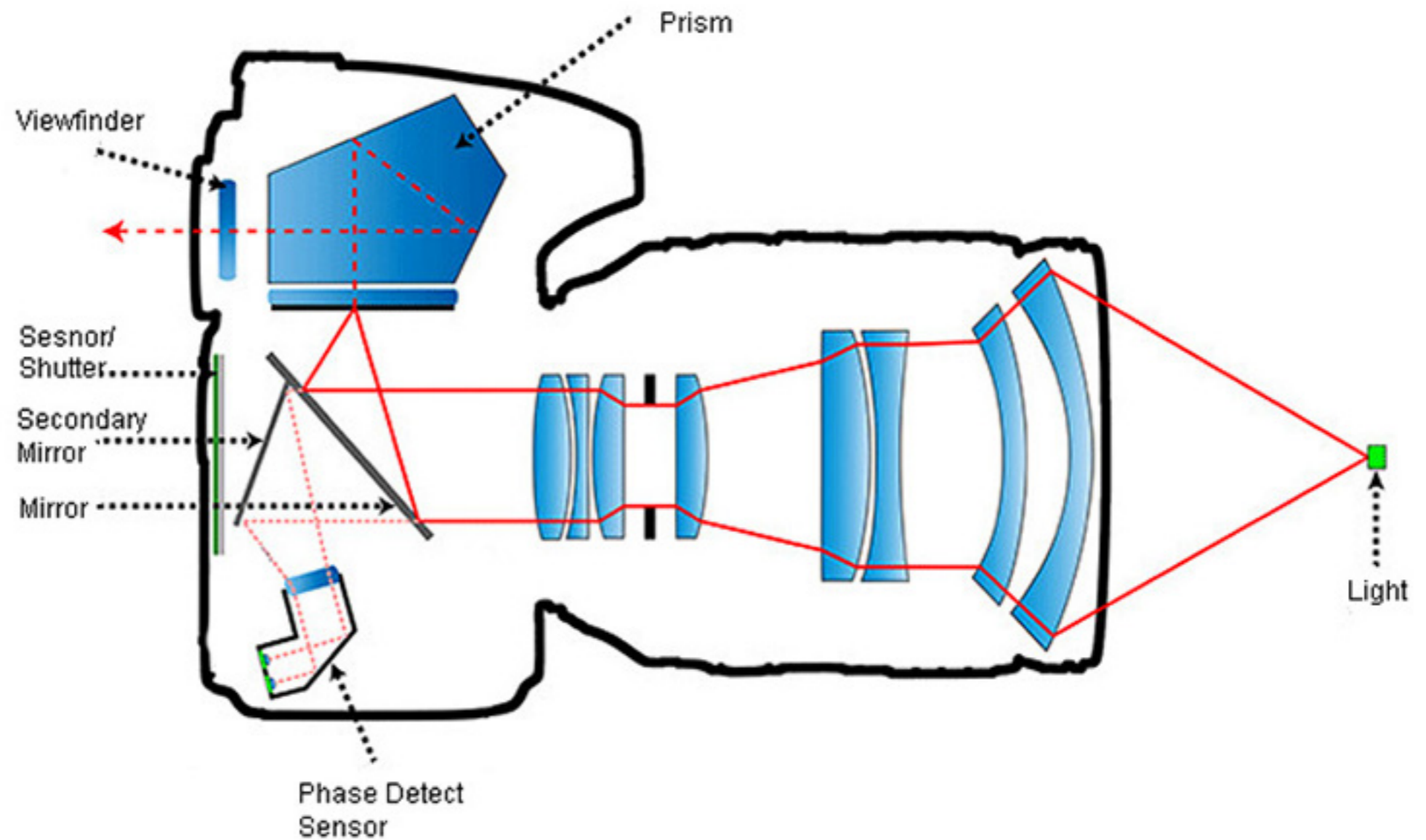
DSLRs use Phase Detection as primary focus system
- Switch to contrast in live view

Compacts use Contrast AF

Mirrorless use one or the other or both

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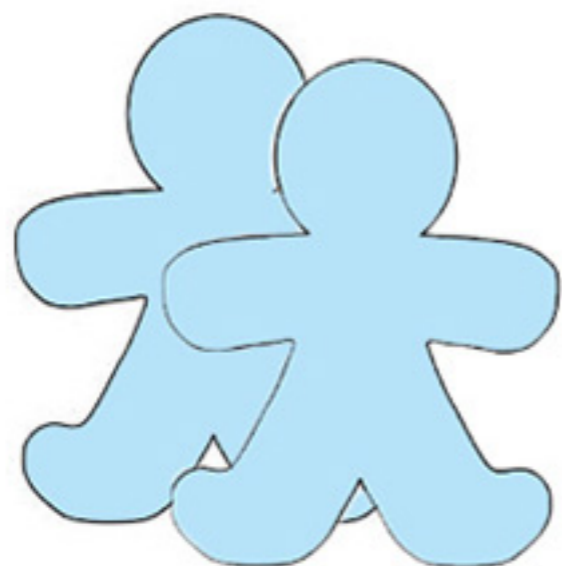
Phase Detection AF vs. Contrast AF



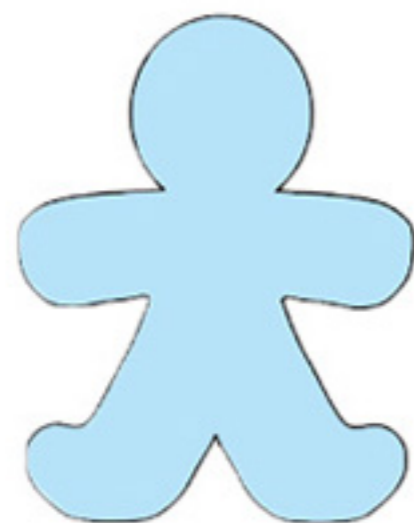
Source: <https://photographylife.com/how-phase-detection-autofocus-works>

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Phase Detection AF



Out of focus

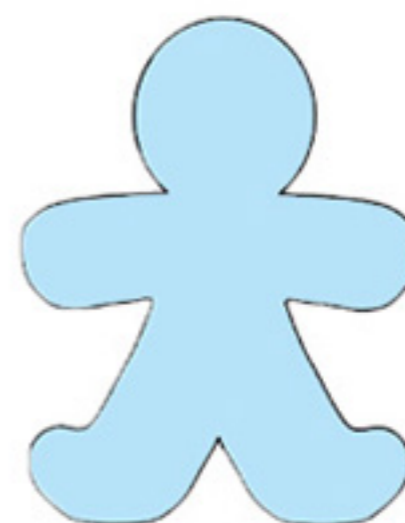


In focus

Contrast AF



Out of focus



In focus

Phase Detection AF vs Contrast AF

Phase Detection AF is faster than Contrast AF, but...

Phase may get out of sync, resulting in back focus or front focus

Correct back or front focusing with

- AF Fine Tune (Nikon)
- AF Micro Adjust

FOCUS

Sharp contrast equals sharp focus.

What affects it:

- Light levels: Low light means low contrast making it difficult to focus
- Contrast: Bright scene may still have low contrast
- Motion: Moving targets can be hard to catch

Focus Controls

Focus Modes (Canon/Nikon)

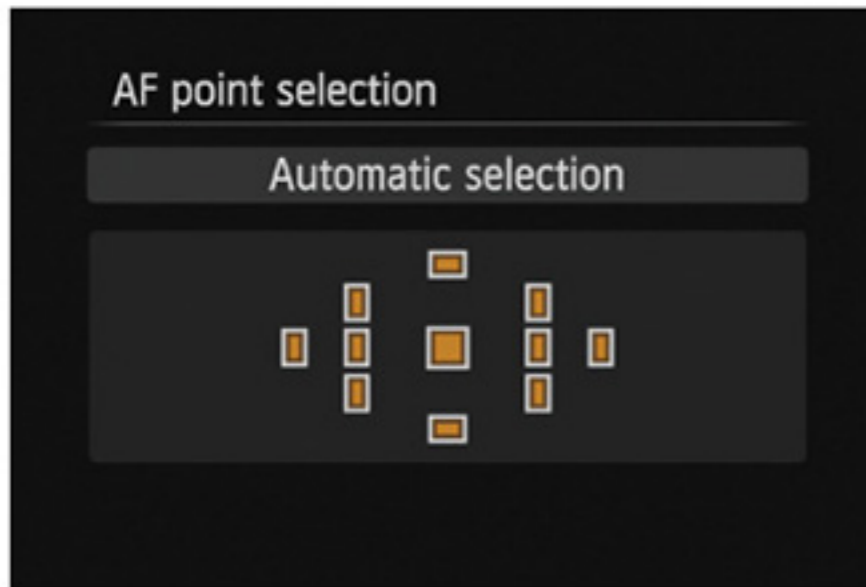
One Shot/AF-S - For focusing on still subjects: flowers, portraits, landscapes, etc.

AI Servo/AF-C (continuous) - Focus stays locked onto subject if it moves: children, sports, wildlife, etc..

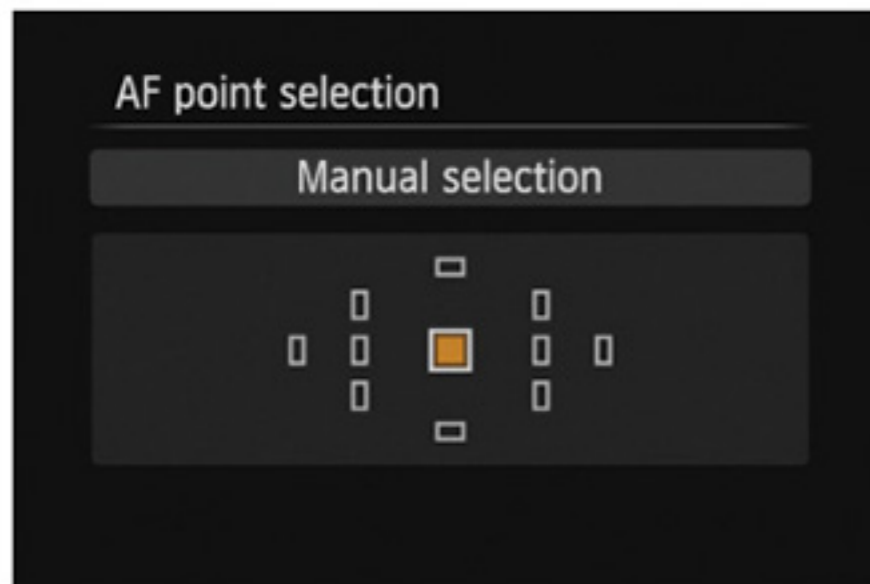
AI Focus/AF-A - Switches automatically between One Shot/AF-S and AI Servo/AF-C

Focus Controls

Focus Point Selection



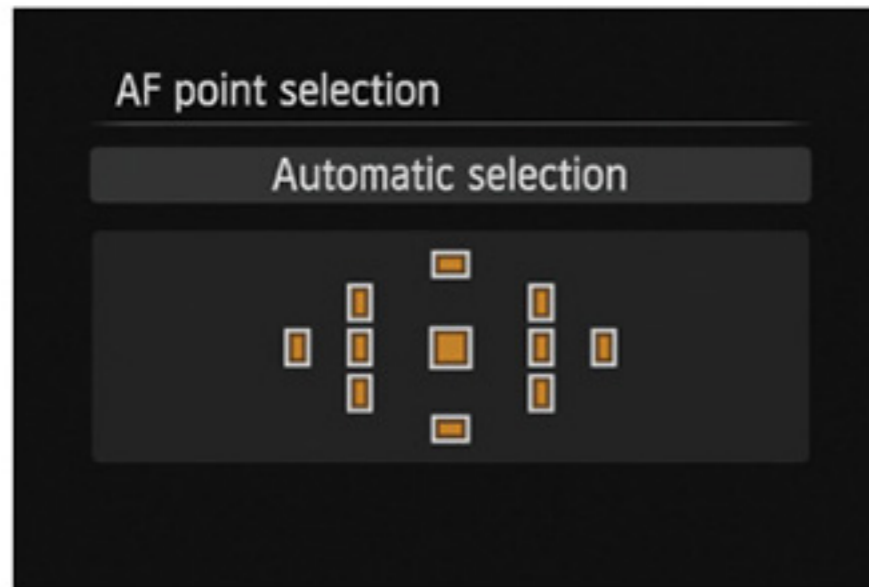
Automatic or Multipoint
All focus point lights, or just a group, light up.
The camera decides what will be in focus (the closest object).



Manual/Single Point
Only one focus point lights up.
You select which point you want to use.

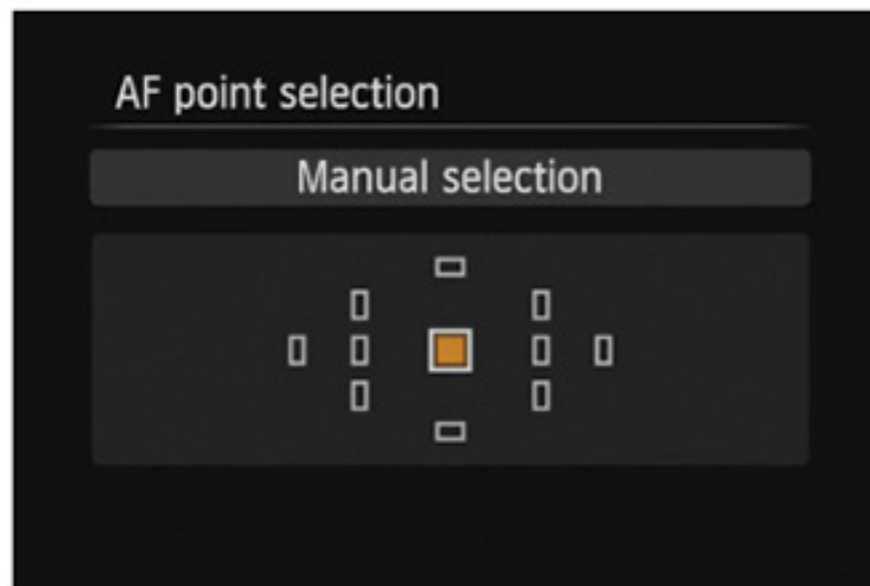
Focus Controls

Focus Points



- Several types of focus points:
- Horizontal (for vertical edges)
 - Vertical (for horizontal edges)
 - Cross-type for both
 - Double cross-type

Center focus point is generally fastest and most accurate (it is often a cross-type or double cross-type)



Read your manual's chapter of focusing.

Your camera may have special functions.

How to minimize Depth of Field



F5.6, 1/500th sec., 400mm Lens

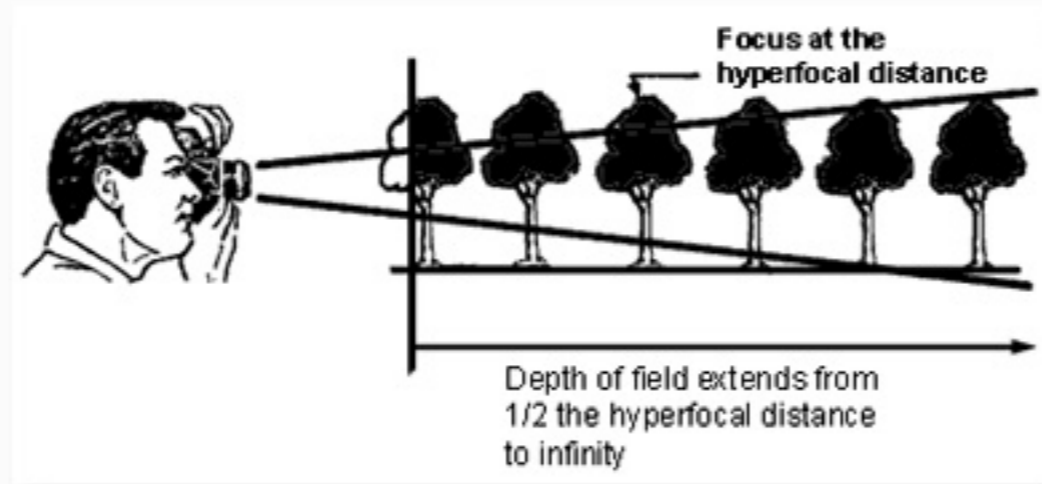
Use low f-stop, close to subject, long focal lens

How to maximize Depth of Field



High f-stop (f8 and up)
Not too close to subject

Use Hyperfocal Distance to Maximize DOF



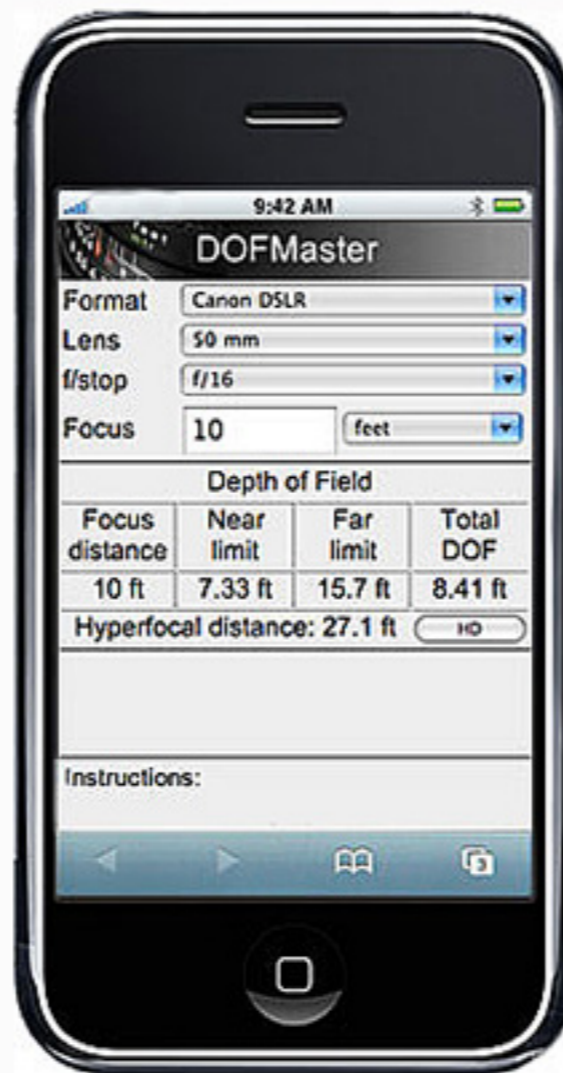
Hyperfocal Distance: the focus point that gives you maximum depth of field. Everything from halfway between you and the point and infinity is acceptably sharp.

(Myth: Focusing 1/3 into scene gives you hyperfocal distance.)

Hyperfocal Distance Examples

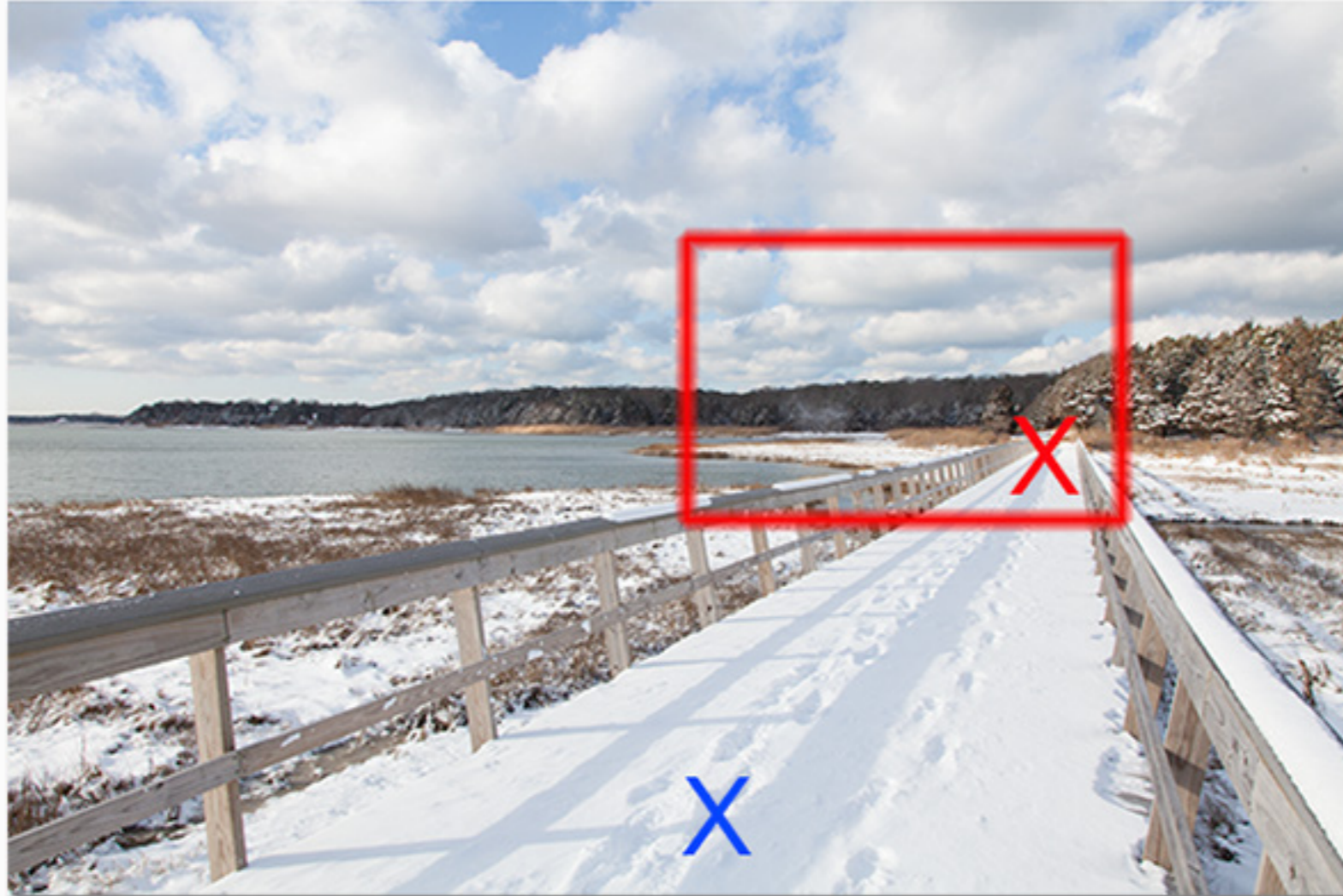
Camera:	Canon 5DII (full frame)	7D (crop)
Focal Length of Lens:	24mm	24mm
Aperture:	F11	F11
Hyperfocal Distance:	6 ft.	9 ft.
Near Distance:	3 ft.	4.5 ft.
Focal Length of Lens:	100mm	100mm
Aperture:	F11	F11
Hyperfocal Distance:	97 ft.	153 ft.
Near Distance:	48 ft.	76 ft.
Focal Length of Lens:	100mm	100mm
Aperture:	F16	F16
Hyperfocal Distance:	69 ft.	108 ft.
Near Distance:	35 ft.	54 ft.

***YOU CAN FOCUS CLOSER THAN YOU THINK
WITH A WIDE ANGLE LENS***



Hyperfocal Distance Apps like Depth of Field Master (dofmaster.com) calculate distance for you based on camera model, focal length of lens and aperture.

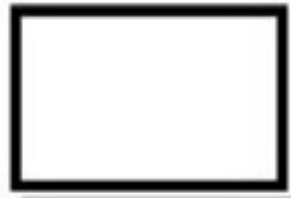
How to maximize Depth of Field using hyperfocal distance



Canon 5DII
F11
24mm
Hyperfocal Distance: 5.65 ft

Canon 5DII
F11
100mm
Hyperfocal Distance: 97 ft

Drive Modes



Single Shot (not to be confused with single shot focusing)

You have to press the shutter every time you want to take a picture.



Continuous/Burst (not to be confused with continuous focus mode)

Hold the shutter button down and the camera will continue to take pictures.

- Burst Rate - how many frames per second (fps) your camera will shoot
- Buffer Size - Amount of camera RAM to store shots while writing to memory card

If your pictures aren't sharp and ...

- You have control of your focus points
- Your shutter speed is fast enough
- The subjects aren't moving
- No camera shake...

You MAY have a front or back focus problem.

Correct it with

- AF Fine Tune (Nikon)
- AF Micro Adjust

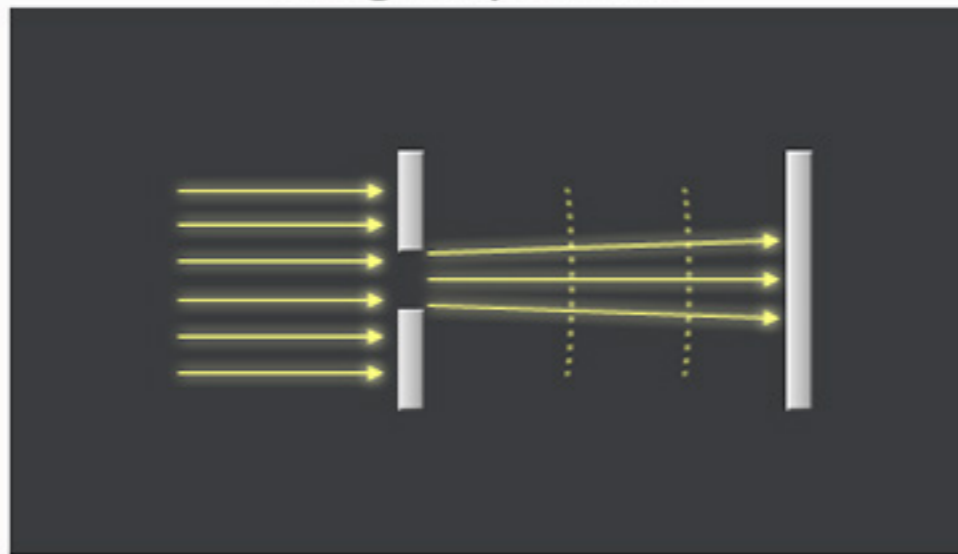
Do it yourself or send it to a service center.

Diffraction

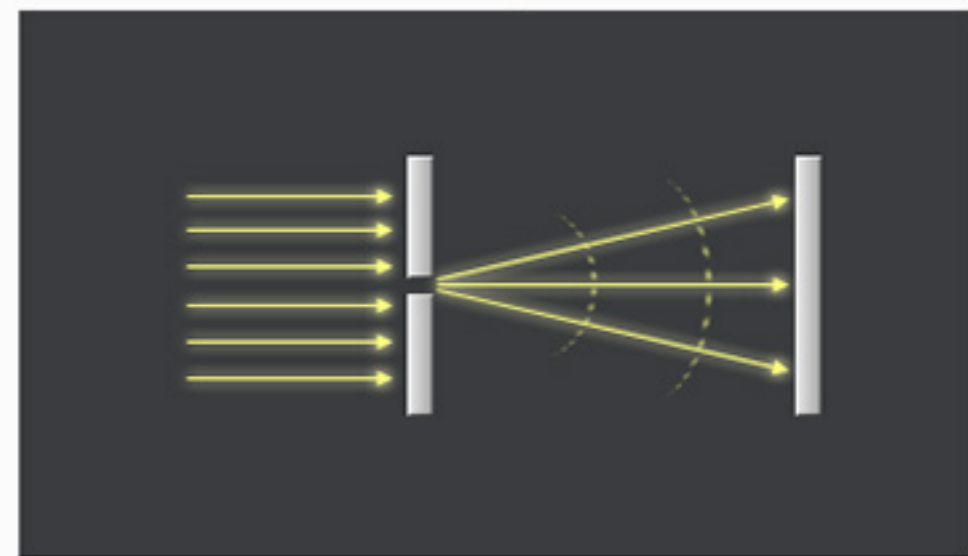
Small apertures (high f-stops) may cause light waves to interfere with each other, reducing resolution (sharpness).

Consequently, f16 may decrease sharpness.

Large Aperture



Small Aperture



Source: www.cambridgecolour.com

Diffraction

Most likely to affect cameras with crop/APS-C sensors
and high megapixels

Will F11 and hyperfocal distance give you enough depth of field?

Don't worry about it too much.

Diffraction Limit Calculator

<http://www.cambridgeincolour.com/tutorials/diffraction-photography.htm>

Back Button Focusing

Canon w/AF-On Button. Go to Custom Function 2, then Custom Controls, then change the shutter button function from Metering and AF start to Metering start only

Canon without AF-On Button. Procedure may vary. Try Custom Functions, Metering start/Meter+AF Start

Nikon w/AF-On Button. Go to Menu, Autofocus, AF activation and select AF-On.

Nikon without AF-On. Custom Settings menu, Controls section, select Assign AE-L/AF-L button and scroll down to AF-On. Press OK. The AE-L/AF-L button will act as an AF-On button.

Out of Focus or Just Blurry?

To reduce chance of blurriness
from camera shake:

Out of Focus or Just Blurry?

To reduce chance of blurriness
from camera shake:

- Make sure shutter speed is fast enough
- Use IS/VR if available
- Hold camera steady if hand held
- Use a tripod if possible
(turn off IS/VR if using tripod)
- Use mirror lock-up if using tripod

Live View Focusing



Great for landscape, still life and macro
Precise focusing
Automatic mirror lockup
WYSIWYG (What you see is what you get)
May be difficult to see LCD in daylight -
a loupe may help

SUMMARY

Contrast creates better focus target

Single point focus gives you more control over focus point

Hyperfocal point maximizes DOF

Out of focus vs. blurry:

Know the difference and how to prevent

Use back-button focusing

Read your manual