Lens Mount Adapters

A lens adapter allows you to mount a lens with a certain style bayonet on a camera with a different style lens mount.

For example, you can get an adapter to mount a Canon lens on a Panasonic mirrorless camera.

You'll always be adapting lenses made for larger or larger-mount cameras to smaller crop sensor cameras like APS-C and Micro Four Thirds.

Standard adapters do not contain any optical elements and are basically metal and plastic tubes that serve simply to connect a lens and camera with different lens mounts.

When you are using a crop sensor camera, due to a smaller sensor, both adapted (and native) lenses have fields of view that are smaller than those on full-frame cameras.

A "nifty-50"mm lens on an APS-C (1.5x crop factor) camera will have a field of view equivalent to a 75mm lens on a full-frame camera.

The 35mm focal length lens on an APS-C camera is needed to get the traditional 50mm "normal" field of view of the classic 50mm lens.

While this change in focal length is not always a bad thing, if you have a favourite lens from your past, such as a trusty 50mm prime and you want to use it on your new crop-sensor camera while maintaining the same familiar field of view, you can do that with an optical adapter that virtually eliminates the smaller lens's crop factor.

Some adapters include optical lens elements inside of them. Depending on the brand, these adapters maybe called Accelerators, Speed Boosters or Focal length reducers.

These specialised adapters not only change the effective focal length of a given lens but they also increase your lens's maximum aperture!
The Speed Booster is, for all intents and purposes, an effective focal length reducer. You may be familiar with the lens teleconverter that effectively increases a lens's focal length, the Speed Booster does the opposite and reduces the lens focal length.
The main selling points for Speed Boosters claim a"1-stop increase in lens aperture."
If you are photographing with a lens with a maximum aperture of F2, you know that you physically cannot turn the aperture ring (or electronic controls) farther than that F2 setting.
So how does the addition of a "magnifying lens" inside the speed booster allow us to have an effective wider aperture?
Without getting too deep into the optical maths here basically:
We know from basic kens theory that:
F stop = Lens Focal length / Diameter of lens aperture (actually entrance pupil) of the lens.

I'm not sure that calculating how the "entrance pupil" is measured would benefit this discussion let's just say that if you know that the entrance pupil is the diameter of the on-axis light passing through the lens from the front and not necessarily the size of the first element of the lens, we can begin to understand the second part of this equation. Just look at the apparent aperture when looking from the front of the lens and then look at from the rear of the lens and you will see the apparent aperture is quite different.

If we go with the maths here, the effective aperture of the lens does not change but we have effectively changed the lens focal length and that, in turn, changes the f/stop number.
With a 50mm lens alone we can calculate the effective aperture:

- So a 50mm focal length lens / 25mm aperture diameter gives an aperture of F2.

And now with the 50mm lens with a 0.7x Speed Booster lens:

- We create a 35mm effective focal length / 25mm entrance pupil = F1.4

So this apparent aperture is now F1.4.


Canon EF 85mm F1.8 adapted to Canon EOS M
F1.8


Canon EF 85mm F1.8 adapted to Canon EOS M
with 0.71X Speed Booster
F1.2 (now EFL 60mm)

Effect on Depth of Field?

So if the lens's effective focal length and effective aperture change will this affect its depth-of-field performance?

Well we know that depth of field is affected by focal length, aperture, circle of confusion, and focus distance.

In the case of employing a Speed Booster, the changes to effective focal length and effective aperture mathematically cancel out any changes to the depth-of-field equation for a "Speed Boosted" lens.

Using the picture examples above, using an online depth-of-field calculator, you will find that a 85mm 1.8 lens has the same depth of field for a given focus distance and sensor size as a 60mm F1.2 lens. You can see this from the two images they look identical. The first taken with the standard EF to EOS M adaptor and the second with the 0.71x Speed Booster adaptor fitted. In each case the camera position was unchanged.

So using these "focal length reducers" / "speed boosters" it is possible to convert full frame lenses to APS-C or Micro Four Thirds and get a wider field of view and increase in maximum aperture. A useful device to have in your camera bag.

More in detail review of both adaptors on this page of my Photographic blog:

https://www.grahamhoughton.com/reviews-2/