

Field Tests: Nikon's Series III Teleconverters

Before the introduction of the Nikon D3, serious Nikon-using nature photographers were equipment-challenged compared to their Canon-using counterparts. The Canons performed better at moderate to high ISO settings and the autofocus systems were superior. And, to make matters worse, even their teleconverters were better! But when the D3 started hitting the shelves late in 2007 Nikon pulled back ahead, at least in camera bodies. But Canon STILL had better teleconverters! Roll the clock ahead to January 2010 - Nikon begins introducing their re-designed "aspherical element" series III teleconverters with the release of the 2x TC-20EIII. Has Nikon finally caught - or surpassed - Canon in teleconverters too? Read on...

This page was created on February 22, 2010, shortly after I completed field testing the TC-20EIII. If and when Nikon updates their two remaining series II teleconverters (the TC-14EIII and the TC-17EII) they will be added to this page. Based on what I have found with the TC-20EIII, I hope they do so soon...

A few words about my field testing protocols:

I test my gear quite extensively in an effort to discover how it will perform for ME (using my own shooting style) in a field situation. I'm not paid to test equipment, nor do I receive my gear for free. I test them under field conditions ONLY (no lab work) and use the same techniques I'm likely to use when I'm shooting the particular item in the field. While I do some of my testing very methodically, much of it is pure "field shooting". I do NOT shoot images of targets under rigidly controlled lab conditions - I shoot images of wildlife (or "proxies", such as my Portuguese Water Dogs) in the field. It's not critical to me to produce results that are generalizable or that are rigorous enough to be published in a peer-reviewed journal - I care about how I can use the gear in the field and how to get the results I need to sell images! While some "lab tests" have a real-world correlate that translates into a limitation in the field, I find an increasing number of tests quite esoteric and the "differences" between two products is real only in a statistical sense (and has no real correlate in producing a quality image, which is NOT a pure science). There ARE tests I rely on - for instance, I find dxomark.com's published values for "Low-Light ISO" performance are almost always close to what I consider "acceptable image quality" (in terms of noise), and thus they have a real-world correlate for me.

So, when it comes to testing teleconverters, some of my tests are performed while hand-holding the lens/TC combo, while others (things like assessment of the effect of stopping the host lens down) are done mounted on a tripod. What I want to discover from my tests are things like: "Is the AF fast enough with this TC and this lens to hold focus on a grizzly charging directly at me?" or "How much do I have to stop down the TC-20EIII when paired with my 300mm f2.8 VR to get results I'll be happy with?"

I make no claim about generalizability of my results - they simply tell me how MY COPY of the TC works for ME in the field. All my tests on the TC-20EIII were performed using an FX body (Nikon D700). I would GUESS that performance would be as good or better on DX bodies. It would not surprise me if the same general findings apply to the higher resolution bodies (like the D3x), but these bodies are known to be particularly demanding on lenses so it's possible that certain characteristics (likely edge-to-edge sharpness) will differ when this teleconverter is mounted on the D3x.

Nikon's TC-20EIII 2.0x Teleconverter

First the Executive Summary, followed by Way More Detail

The Executive Summary:

My copy of the "new" 2x teleconverter from Nikon (the TC-20EIII) represents a dramatic improvement over its "Series II" predecessor (the TC-20EII). This means that the output using the two TC's went from virtually unacceptable (with the TC-20EII) to completely acceptable (with the TC-20EIII) for virtually any use. With all lenses tested with the new TC images were visually slightly less sharp when shot wide open (at maximum aperture size) compared to when stopped down by a single f-stop. In most cases, and with most lenses tested, stopping the aperture down further resulted in only very, very minor increases in sharpness. Both image contrast and colour saturation shot with images using the TC-20EIII showed only marginal reductions compared to when NOT using the teleconverter (while the previous model of reduced image contrast and saturation quite dramatically). I experienced the best image quality, and highest overall "usability" of the lens/TC combinations when pairing the TC-20EIII with "f2.x" lenses (the 70-200mm f2.8 VR II, the 200mm f2 VR, and the 300mm f2.8 VR). However, I was able to produce very acceptable results when using the new TC with selected f4 lenses (the 200-400mm f4 VR and 600mm f4 VR). Autofocus speed (including initial focus acquisition and focus-tracking on moving subjects) was only slightly impaired on the f2.x lenses. Despite Nikon's claim that autofocus does NOT work with f4 lenses, I found that autofocus did work (albeit in a reduced capacity) on both f4 lenses tested (but was accurate and efficient only using the more central of the D700's 51-focus brackets, i.e., autofocus with extreme outer focus brackets was completely inefficient or failed outright).

In summary - and to be brutally honest - I found the best use of the "old" TC-20EII was as a paperweight. In stark contrast, the new TC-20EIII is a useful photographic tool that has earned a permanent space in my gear bag.

Way More Detail - And Sample Images

Caveats, Qualifiers, and Guidelines: Some important contextual information to keep in mind:

- 1. Different Photographers, Different Standards.** If I say "...using the TC-20EIII when shooting wide open with Nikon's 200-400 mm VR zoom doesn't work for me" that's EXACTLY what I mean - it doesn't work for ME. It may well work for you and you may be absolutely happy with the resultant images. In other words, because what constitutes a "good image" varies with the photographer, I do NOT claim that my views have universality. This is simply a record of what works for me.
- 2. Acceptable Image Degradation.** You'll hear me use the term "acceptable image degradation" - here's what I mean: There are times when an image is noticeably "degraded" (e.g., less sharp, less contrast, less vibrant colours, etc.) when viewed at 100% magnification on a quality computer monitor - BUT that degradation is either manageable and/or reversible through digital editing or virtually irrelevant (to MY eye) when the image is printed. When this situation occurs I call it "acceptable image degradation". Not surprisingly, when the the image degradation is not manageable/reversible through digital editing or the degradation is readily noticeable when the image is printed, I refer to it as "unacceptable image degradation."
- 3. No Firm Between-Lens Generalizations.** It is very difficult to predict how a specific teleconverter will work with a specific lens (without testing it). Some very good lenses (e.g. Nikon's 200-400mm f4G VR) work only "passably" while others (e.g., Nikon's 200mm f2G IF-ED VR) LOVE teleconverters.
- 4. High Performing High ISO Cameras Help.** I've found that it's easier to successfully use teleconverters with cameras that have stellar high ISO performance (think Nikon D3 and successors) than those with poorer high ISO performance. The

reason for this is simple: the ability to use higher ISO's makes it much easier to stop down your lens in a field setting (especially when hand-holding the camera) and thus you get better teleconverter performance. For instance, I find that the D300 is about one to one and a half stops better in ISO performance than the D200 or D2X(s). When you use teleconverters in the field this will help some. But I have found a two to three stop improvement in ISO performance in the D3 (compared to the D2X). In practice this makes the camera MUCH easier to use in the field with teleconverters. But, the improvement of the ISO performance of the D3 comes from a larger image sensor - which brings up another issue: teleconverters are notoriously soft (focus-wise) on image edges - is the edge softness on the large-sensored D3 when paired with a teleconverter so pronounced that it wipes out the advantage of easier stopping down? To be honest, I've watched for this and have NOT found excessive edge softness to be a problem. Given my propensity to use teleconverters only when photographing wildlife (and not flat walls of bricks), and the fact that I often like to isolate my subject using selective focus (with out-of-focus edges anyway), my sensitivity to this possible problem is probably quite reduced. It may be a problem for other shooters.

5. *About "My Usability Rating" Scheme:* I have rated each TC/lens combination field-tested on a subjective usability index. This index is NOT scientific and is merely a reflection of how useful the TC-20EIII will be for ME in a field setting. It functionally combines image quality and ease of use in a field setting (which, in turn, is affected by things like autofocus performance, probability of holding a particular lens/TC combo still enough to get a sharp image in a field setting, etc.). This usability rating factors in a consideration of how I will use the particular lens/TC combination in the field - I EXPECT to be able to hand-hold the 200mm f2 VR with the TC-20EIII but I DON'T EXPECT to be able to hand-hold the 600mm f4 VR with the TC-20EIII (and thus I do NOT penalize the 600/TC combo for not having this capability). My usability scale has 5 categories: Very Low; Low; Moderate; High; Very High.

Results with Specific Lenses: I tested the TC-20EIII with the following Nikon lenses on my D700: 70-200mm f2.8 VR II, 200mm f2 VR, 300mm f2.8 VR, 200-400mm f4 VR, and 600mm f4 VR. Here is what I found:

1. 70-200mm f2.8 VR II: The addition of the TC-20EIII teleconverter turns this lens into a 140-400 f5.6 zoom lens. I was extremely (but pleasantly) surprised how well this combination performed. There is slight image softness when shot wide open (f5.6) but stopping down by one stop (to f8) removed most of this softness and produced minimal (and very acceptable) image degradation. This hand-held [grab shot of my young Portuguese Water Dog](#) (at 400mm EFL) is typical of the results I regularly obtained using this lens/TC combo. Any decrease in the speed of initial acquisition of autofocus was barely noticeable, but I did notice a slight decrease in the ability of the lens/TC combo to keep fast moving objects in focus (in this case, the number of in-focus shots of my dogs running directly at me was about 40% lower than when I use the 70-200 VR II alone). Focus-tracking subjects moving slightly slower (see, for example, [this shot of my other Portie trotting at me](#) at moderate speed) - which represents a scenario more similar to what I would commonly encounter when photographing wildlife in the field - produced a very high ratio of in-focus to out-of-focus images. Overall I found the results of this new 2x TC paired with the 70-200 f2.8 VR II virtually on par with those obtained when pairing the lens with the 1.4x TC-14EII - it's THAT good! There will be very few photographers who will be unhappy with the results produced when the TC-20EIII is used with the 70-200mm VR II.

My Usability Rating for the 70-200mm f2.8 VR II plus TC-20EIII: Moderate to High

NOTE: I know I will be asked how the TC-20EIII performs with the "old" 70-200mm f2.8 VR. I no longer own this lens so I honestly don't know the answer to this question. Personally, because the "new" 70-200 f2.8 VR II outperforms the previous model fairly significantly (especially on FX bodies), I would be surprised if the TC would work as well with the older lens. But this is guess-work on my part.

2. 200mm f2 VR: In my opinion the 200mm f2 VR performed the best of any of Nikon's lenses with the series II TC's. In fact, this was the ONLY lens I would consider using the "old" 2x TC-20EII with. Thus, I was not surprised to find that the TC-20EIII worked very well with the 200mm f2 VR. Paired together this lens and TC gives you a 400mm f4 lens in a relatively compact package, and one that is easily hand-held. And the obvious question (and the one I've been getting email about from everywhere!) is this: Can you shoot it wide open and still get acceptable results? In my opinion - yes. While there IS a slight increase in sharpness when stopped down by 1-stop, it is less obvious than with any other lens I tested. But you decide - compare the following image pairs (one pair shot at about 4 meters to the subject; the other shot at about 20 meters to the subject): [Red Squirrel at f4](#) and [Red Squirrel at f5.6](#); [Jose the Posing Portie at f4](#) and [Jose the Posing Portie at f5.6](#). Careful observers will notice that in this second image pair the slight decrease in sharpness when shot at f4 is partially offset by the smoother and more pleasingly blurred background when shot wide open (i.e., the "apparent sharpness" is almost as high at f4 as at f5.6). Autofocus speed? This lens always focuses phenomenally fast, and continued to do with the TC on. I noticed no obvious degradation of AF performance with the TC.

My Usability Rating for the 200mm f2 VR plus TC-20EIII: High to Very High

3. 300mm f2.8 VR ("old" model): One word: WOW! In my opinion this lens matches up with the new TC-20EIII better than any other - it's almost like this TC was designed with this lens in mind. The result is a hand-holdable, compact 600mm f5.6 lens that produces beautiful high-contrast images with hardly ANY degradation of sharpness at all. Yes, sharpness does improve when stopped down by one stop (to f8), but again the difference is quite minimal. This [grab shot of my young Portie](#) is absolutely typical of the hand-held shots I captured with this lens/TC combo. When I used more careful technique and used a tripod the results were even better (check out this [Black-capped Chickadee](#) captured under natural light). Autofocus speed and accuracy? Very good - check out these two images of Poncho running directly at me at full-speed - these images were 3 frames apart in a 8 fps sequence and while the first image is SLIGHTLY sharper (and the two intervening images were sharp as the first image), both are very acceptable ([Image 1 of Poncho on the Run](#); [Image 2 of Poncho on the Run](#)). And, by the way, the noses and mouth region were wet (i.e., not over-sharpened). As one who loves to shoot 600mm lenses I can honestly say that my arms look very forward to using this lighter weight combination!

My Usability Rating for the 300mm f2.8 VR plus TC-20EIII: High to Very High

4. 200-400mm f4 VR: I was almost never happy with the performance of the 200-400mm f4 VR when used with any series II teleconverter. Occasionally, and when stopped down (to the f11 or smaller range) I did get acceptable results with the 1.4x TC-20EII. But only occasionally. However, it IS possible (though not too likely) to get quality results shooting the 200-400mm with the 2x TC-20EIII. I did NOT get any really good results (at any focal length) when shot wide open (f8 with this lens) but, like with the other lenses, stopping down by one stop (which already brings us to f11) produced acceptable - but not stellar - results. In the literature supplied with the TC Nikon states that autofocus does NOT work with this lens. It did on mine. But, autofocus is noticeably slower AND if you lose focus there is a lot of hunting around to regain it. And, this is for the more central of the 51 autofocus brackets - when I wandered out to the AF brackets on the extreme edges I did NOT have autofocus. I also found that at moderate distances (above about 20 meters) that the AF is "finicky" and often needs a slight manual over-ride. If one is shooting subjects at moderate to long camera-to-subject distances zoomed to 400 mm (so 800mm EFL), the practical considerations of finicky focus and the need to REALLY hold this camera/lens still (800 mm is a LOT of lens, especially on a DX camera, where it becomes functionally equivalent to a 1200mm lens), will definitely reduce your ratio of keepers to deleters. BUT, it is possible to get good images out of this lens/TC combination.

This [image of a white-tailed deer](#) represents the type of results I got with the 200-400 and TC-20EIII combo, so you can see it's not THAT bad. But, it would be hard for me to recommend anyone buying this TC for exclusive use on this lens.

My Usability Rating for the 200-400mm f4 VR plus TC-20EIII: Very Low to Low

5. 600mm f4 VR: This lens/TC combo produces a 1200mm f8 lens on an FX body, and an 1800mm equivalent on a DX body. And, ANY 1200mm to 1800mm lens is a challenge to use. Add in the "close down one stop" rule and you have a 1200mm/1800mm f11 lens. You won't be hand-holding this combination (unless you love abstract shots). But it works. And while the autofocus doesn't work perfectly, it does work better than on the 200-400mm f4 VR (and it's another combination that Nikon claims does NOT work). On close subjects you will have an extremely thin depth of field (to say the least) - see this [image of a Black-capped Chickadee](#) as an example - the in-focus elements (like the eye) are quite sharp, but not much else is truly in focus! However, move the subject back a little and stop down some, and you can obtain some very sharp results (like this [Bighorn Ewe portrait](#), shot at 18.8 meters). How much stopping down is required to produce "sharp enough" images at a moderate distance? You judge - check out these 3 images (slightly cropped, but all at 100% magnification - LARGE DOWNLOAD WARNING - approx. 1 MB per image) of a Bighorn Ewe shot at 40 meters - [this one at f8](#) (wide open), [this one at f11](#), and [this one at f16](#). Of this sequence, I would probably select the f11 shot - the ewe is passably sharp and the background has a nicer texture to it than on the f16 shot. Like with the 200-400mm f4 VR, I don't see many photographers finding this lens/TC very useful all that often, but when you do find the right conditions it can be quite usable!

My Usability Rating for the 600mm f4 VR plus TC-20EIII: Moderate to High (assuming very good technique)

The Obvious "Missing" Lenses: I anticipate getting email asking me about how the following lenses work in combination with the TC-20EIII: the 300mm f4, the 400mm f2.8 VR, and the 500mm f4 VR (I've already commented above about how it might work with the "old"70-200mm f2.8 VR). I don't own these lenses but from what I know of them I would venture the following GUESSES:

1. 300mm f4: Given that you'll have a non-VR 600mm f8 lens (and one that will likely need to be stopped down to f11 to produce the sharpest results), I'm thinking this will be a pretty non-useful combination for most anything for most shooters (I know I'd find little use for it). Which means, of course, someone will send me a fantastic shot about one week after I post this field test! ;-)

My PROJECTED/EXPECTED Usability Rating for the 300mm f4 plus TC-20EIII: Very Low to Low

2. 400mm f2.8 VR: Given this lens' sharpness, reported performance with the series II TC's, VR function, and the fact that it has an aperture of f2.8, I'm guessing that it's likely the 400mm f2.8 VR will work VERY WELL with the TC-20EIII. The combination will produce a 800mm f5.6 lens that will likely be able to be shot wide open AND that will autofocus well. It will still require good technique to extract sharp images with this combination, but it should be quite possible. I look forward to hearing what those that test this combination discover. NOTE TO NIKON: If you would like me to test this lens/TC combo, please send a copy of this lens to me ASAP - I will pay postage and promise to return it - really!

My PROJECTED/EXPECTED Usability Rating for the 400mm f2.8 VR plus TC-20EIII: High (assuming good technique)

3. 500mm f4 VR: OK, this is a complete guess, but I'm thinking that the reduced AF capabilities of this lens/TC combo, plus the reasonably extreme magnification of this combination will combine to slightly limit the usefulness of this combination. The VR will help improve it's usability, but it still won't be EASY to get good results from this pair (but it should be possible).

My PROJECTED/EXPECTED Usability Rating for the 500mm f4 VR plus TC-20EIII: Moderate to High (assuming good technique)

Closing comments: The TC-20EIII is a HUGE improvement over its predecessor. As a non-Canon user I can't fairly say it's better than Canon's 2x Tele-extender. But I'd be surprised if Nikon's TC-20EIII isn't at LEAST as good as Canon's offering. I can honestly recommend this product - it's a very good product and worth the money.