

SLR Photography with Swarovski 80mm and 65mm Spotting Scopes

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This text will cover equipment and techniques for taking photographs through Swarovski Optik spotting scopes using virtually any interchangeable-lens Single Lens Reflex camera.

1) Which scope?

It does not matter whether you are using the old-style (gray) AT or ST 80 scopes, the new (green) ATS or STS 80 scopes, or the compact ATS / STS 65 scopes. The camera adapters will work fine with any scope. The High Definition (HD) version is the recommended type of scope for photography – it has superior contrast and color saturation when compared to the standard models. This will result in brighter colors and a crisper image. As to scope style, I usually use the AT (angled eyepiece) because it allows me to set the tripod lower, and thus get a more stable base to shoot from. However, if you already have a straight-through (ST) scope there is no disadvantage to using it, and you probably will be a little more comfortable with the ST for finding and following a moving subject.

2) Which camera adapter?

Swarovski Optik has marketed two different spotting scope Camera Adapters for nearly a decade. One turns the spotting scope into an 800mm telephoto lens, the other an 1100mm lens. When using a 35mm SLR camera, these will give an image magnification that is 16x and 22x, respectively. The camera adapter replaces the viewing eyepiece of the spotting scope, so you cannot get any kind of zoom lens (variable power) performance. In the fall of 2002, the old 800mm adapter was replaced by a new version – the TLS 800, which features redesigned optics and superior optical performance, especially edge sharpness. While both old adapters are technically discontinued, the 1100mm adapters may still be available, but supplies are limited.

If you have never used a long telephoto lens for still photography (400mm or longer), I would recommend starting with the TLS 800mm adapter. It functions as an f/10 lens on the 80mm scopes and f/12.5 on the 65mm scopes, while the 1100mm becomes an f/13.7 and f/17, respectively. This means that the 800mm gives a brighter image when looking through the camera viewfinder. You will find focusing on the subject is easier, and you will get a faster shutter speed that will help eliminate camera shake (see tripods). Bad focusing and camera shake are the two leading causes of rotten pictures, especially for beginners, so it helps to minimize their effects.

Those that have experience with longer focal lengths can jump directly to the 1100mm, for maximum magnification, but beware that it will also exaggerate atmospheric conditions like haze and heat shimmer (just like when viewing at 60x, sometimes the image sometimes looks better at 45x). Once the 1100mm adapters finally go out of stock, higher magnifications can still be achieved by using a high-quality teleconverter. A 1.4x converter would boost the TLS 800's focal length to 1120mm, or 22.4x.

The adapter mounts in place into the scope body, replacing the scope's viewing eyepiece. In order to attach the camera to the photo adapter, you need to remove the camera's lens and use a T-mount that fits your camera body (Nikon, Canon, etc.) to the TLS 800. Make sure that the T-mount is the correct one for your camera model – for instance, there are two different T-mounts for Canon SLRs; one for autofocus bodies (EOS type), one for non-autofocus (FD type) bodies.

3) Which Camera Body?

Almost any Single Lens Reflex camera body (also called SLRs – they take interchangeable lenses and you actually view the subject through the lens system) should work fine for scope photography, but a few things are desirable. Since the scope has no f-stop settings like a regular lens, it lets in light at a fixed rate – either f/10 or f/13.7, depending on which scope model to use (see above). That means that as the scene gets brighter or darker, you must change shutter speeds to keep the correct exposure.

A camera that has an Aperture-Preferred Auto-Exposure system will change the shutter speeds for you, letting you concentrate on the subject and not worry about the camera settings. “Programmed Auto” and “Shutter-Preferred Auto” systems may not work, but Manual Metering mode or an old-fashioned manual shutter speed setting will work fine. Aperture-preferred works great when shooting print film, but slide film may require you to go to manual override for precise metering of tricky lighting conditions.

Most manual-focus camera bodies use a focusing aid in the center of the focusing screen – either a split-image circle or a ring of microprisms. Any lens that is darker than f/8 will cause the microprism circle and split-image focusing aids in a camera’s viewfinder to go black – this will always happen when taking photos through the spotting scopes. The black spot will not show up on the actual picture, but it will block out the center of the viewfinder and force you to compose your main subject slightly off-center.

If your camera model has the ability to change focusing screens, replace the standard one with an all-groundglass screen.

Unfortunately, most SLRs do not have this feature, so you will have to live with a black spot in the center of your viewfinder. Most auto-focus cameras do not have these focusing aids on the screen, so blackout is not a problem. However, the image is usually pretty dim when compared to

Another handy feature is a motor drive or auto-winder, which allows you to take repeated shots without moving your eye away from the viewfinder while your thumb advances the film, thus losing your subject from view. You also have the ability to shoot rapid sequences of moving subjects.

Some “Auto Focusing” camera systems will NOT work with manual-focusing, non-coupled lenses (also called “non-autofocusing lenses”) – check your camera’s instruction manual. At least a few of the Minolta Maxxum cameras will not work at all with a scope adapter. Also, some of the newer-model Nikon SLRs will not take active meter readings and automatically set exposures when the lens does not contain the electronic contacts they were designed for – again, check your manual. For any of these non-compatible SLRs, there may still be a solution – see section 8 - “Using SLR cameras with the DCA”.

4) Which Tripod?

The brand is not as important as the size – in general, the heavier the better. At 16x and 22x, the image is very sensitive to motion, and the slightest shake will result in a blurry picture. Keep the tripod legs and center column as low as possible when shooting, so they will dampen vibrations more efficiently (a good reason to use the AT-80). A wooden or carbon-fiber tripod will dampen vibrations more efficiently than an aluminum tripod, but the two drawbacks there are weight and cost, respectively. Another alternative is a weight bag – an accessory that hangs below the center column and can be filled with rocks, sand, etc., and provide additional vibration dampening.

When a camera is mounted on the scope, it now becomes very tail-heavy, and a sturdy tripod head is a good thing. A “fluid head” for video tripods usually does not solidly lock down, and the resulting play in the system will be very annoying. The new Swarovski FH 101 Tripod Head moves very smoothly but locks solid with a flip of a switch. Some people use a separate brace that threads into the camera tripod socket and then clamps to one of the legs of the tripod. This works well, but severely limits the ability of the camera to track moving subjects. Using a monopod attached to the camera body will give vertical stability while keeping lateral mobility to track moving objects. The most stable solution is two tripods – one mounted to the scope, and one mounted to the camera. Needless to say, this is not a very portable setup, and you can forget about following moving subjects.

Try using a cable release to minimize the vibrations caused by pushing the shutter button. This will help, but the movement of the focusing mirror flipping up out of the light path is enough to cause image shake during slow (1/30 sec and longer) hands-off exposures. Ditto that when using the self-timer – the vibrations subside by the time the shutter fires, but the mirror slap might still kill the image.

The ultimate setup would be a sliding rail system, similar to what is used on professional view cameras. Two movable mounts on a rail would attach to the camera and scope, while the center mount attaches to the tripod head. The whole assembly now can slide forward until the camera / scope balance point is above the tripod head. This would be a heavier system, but the perfect balance point would make for better control and image stability. By the end of 2004 Swarovski will be producing an offset tripod “balance beam” that will perform a similar function. At the time of this writing, there is no product number introduction date for this accessory.

5) In the Field

Practice assembling the system quickly and efficiently – an eagle sitting in a tree will probably not wait around until you to figure out how everything is supposed to go together.

35 mm SLRs - for your first efforts, choose a film speed that will yield shutter speeds in the 1/500 sec to 1/1000 sec range – 400 speed or 200 speed film will usually work well in most lighting conditions. As the shutter speeds get slower, it becomes more important to keep the system steady when pushing the shutter button. Even a very slight movement at the time of the exposure will result in a blurry picture. CAUTION – a very fast film speed in bright sunlight might exceed the camera’s shutter speed range. Example – 800 ISO film at f/10 on a bright day needs a 1/2000 sec. shutter speed, which many cameras do not have. Most color print films have enough forgiveness to deliver a good picture even when the exposure is not perfect, but color slides require very accurate exposures for good results.

Digital SLRs – pick an ISO setting high enough to give you shutter speeds in the range of 1/350 to 1/1000 sec. or higher. After taking a few shots, post-view the images to confirm that the photos are sharp, and then start reducing the ISO setting to get better image quality. It’s better to have a few grainy but sharp images than to shoot with too slow a shutter speed and have ALL of the pictures come out blurry.

Accurate focusing is critical – the viewfinder is darker than normal, and the depth of field is very shallow. An autofocus system will not operate here – you must turn the scope’s focus wheel just as in visually using the spotting scope. Some autofocus camera bodies have a signal in the viewfinder that indicates a correct focus has been achieved when using manual-focus lenses. Depth of field can be critical in long telephoto photography. An 800mm lens at f/5.6 or f/8 has a VERY narrow depth of field. A small advantage to having an f/11 lens system is that your depth of field will at least be manageable. When photographing animals, sometimes the length of the body extends outside the depth of field. Make sure that the head and eyes are in focus – a sharp body and legs with blurry eyes and head usually looks awful.

Capturing action is tricky – the narrow field of view and shallow depth of field make it hard to keep the subject centered and in good focus at all times. Practice! If the subject repeatedly passes by the same spot, (like a racing car through a corner or hummingbird arriving at a feeder) you can pre-focus at that spot and trip the shutter as it arrives there.

6) Other Stuff

Spotting scopes are NOT lenses designed for photography – they cannot give the same quality results as an 800mm or 1100mm Nikon or Canon telephoto lens. At the same time, those telephoto lenses cost 6 to 10 thousand dollars each, you cannot view through them, and they definitely are not waterproof! The image quality of the older Swarovski camera adapters is best in the center of the picture, and falls off out by the edges of the frame. Since most people are going to use them to photograph things (animals, racing cars, airplanes, etc.) and not landscapes, this effect is minimal. Center the subject in the frame; leave a little space to the right and left edges, and the results will be excellent. The new-design TLS 800 gives superior image quality out to the corners of the picture area, justifying the higher cost.

TAKE LOTS OF PICTURES – If taking photographs with long telephoto lenses were easy, everybody would be doing it! There is no way to get good results without putting in the time and

effort. As you become more familiar with the system, you will end up with better results. Shoot test rolls, taking notes as to shutter speeds, lighting conditions, etc., so when the pictures come back you can see what worked well and what was a disaster. Once you are in the field, take multiple shots of the same subject – one may be just a little better than the others. By now you have probably spent over \$2000 for your photographic system, and film and processing is the least expensive part – don't miss an opportunity for a great image by taking only one shot and walking away.

Worried about the cost of film and developing? That's the beauty of Digital SLRs – you can take 50 shots or 250 shots on a memory card and afterwards simply delete the bad ones!

7) Digital Cameras – the new wave

Digital Single-Lens Reflex (D-SLR) –

There are about a dozen interchangeable-lens Digital SLR cameras (D-SLRs) on the market. They accept the same lenses and operate exactly like their 35mm-film counterparts, but their images are electronic, stored on solid-state memory cards. The best-selling D-SLR models are made by Nikon and Canon. There are other models available from Fuji, Kodak, Olympus, Sigma, and Pentax, while Konica -Minolta recently announced a D-SLR. The first D-SLR models to be introduced were horribly expensive – well over \$5000 for the camera body alone! Thankfully, the prices dropped even as the sensors and processors were improved, and by the summer of 2003 you could purchase an outstanding performer for around \$1500.

In September 2003, Canon introduced the Digital Rebel, selling for \$899, making it the first D-SLR under \$1000. Nikon met the challenge by announcing in Spring 2004 the Nikon D-70, their own under-\$1000 D-SLR. Pentax will be shipping a <\$1K D-SLR in the fall of 2004, and undoubtedly more will be coming from other manufacturers.

In addition to superior color range and image quality, the D-SLRs enable a 35mm camera owner to use all his various wide-angle and telephoto lenses. These cameras can be mounted on the Swarovski Camera Adapters like a normal 35mm SLR, as described above. As an added bonus, the digital body often gives a slightly higher magnification than the 35mm body – for example, the Canon 10D and Digital Rebel give you an image magnification factor of 1.6x. Thus the TLS 800mm adapter now acts like a 1280mm lens, giving a 25.6x image instead of 16x, and the 1100mm gives 35.2x instead of 22x. The Nikon D-SLRs have a 1.5x factor. Check the manufacturer's specifications for their specific D-SLR image magnification factors.

The real fun part comes when you start taking pictures – the procedure is the same as with a 35mm body, but you can immediately review your photos on the camera's LCD screen to verify that you got the shot. Any poor exposures can be deleted, either right then while in the camera, or later on, once the images have been downloaded to your computer. Instead of having to change the film after 24 or 36 exposures, a sufficiently large memory card in the camera will allow you to take hundreds of shots before needing to replace the memory card or downloading the images to a hard drive. Once the images are stored, clear the memory card and start shooting again!

8) Using D-SLRs with the DCA – something NEW!

The Swarovski Digital Camera Adapter (the DCA Zoom, part # 49206) was developed to attach point-and-shoot digital cameras behind the Swarovski 20-60xS zoom eyepiece – a practice known as Digiscoping. Holding a 35mm camera body behind a scope eyepiece will often show an image on the focusing screen, but it usually is surrounded by a ring of black – known to photographers as vignetting.

Recently, I discovered that a D-SLR equipped with a 50mm (normal) lens and the Swarovski DCA can function exactly like a digital point-and-shoot. This gives the photographer a few advantages over the TLS 800 and T-mount systems detailed above -

A) The scope's zoom eyepiece can be used to the photographer's advantage. While the scope is yielding magnifications between 20x and 60x (equivalent to 1000mm to 3000mm lenses in 35mm-speak), the D-SLR's image magnification factor gives even MORE magnification. My Nikon D1 has an image magnification factor of 1.5x, so behind the zoom eyepiece the camera sensor is receiving image magnifications of 30x to 90x (that's 20-60 x 1.5), or the equivalent of a 1500-4500mm telephoto lens!!!

B) In the field, you can use the spotting scope normally until you want to take a picture, at which time the camera / DCA Zoom assembly attaches in seconds and is immediately ready to shoot. With the TLS 800, you must first remove the scope eyepiece from the scope body, attach the TLS / camera assembly, and then start shooting. An animal or bird might not give you the time to get everything set.

The DCA works in three pieces – an inner tube, an outer tube that slides over it, and the mounting ring that attaches to the filter threads of the camera's lens. The 20-60xS eyepiece has an eyecup that unscrews (counterclockwise). Remove it, and slide the DCA-Zoom inner tube down the eyepiece until it stops. Attach it to the barrel of the eyepiece by tightening the thumbscrew, and reattach the eyecup over top of the DCA-Zoom tube. You can still change the eyepiece zoom settings by turning the DCA-Zoom tube, plus the lens cap still fits atop the lens, so I just leave it on my scope at all times.

Now attach the DCA-Zoom outer ring to the filter threads of the camera lens. The DCA-Zoom comes with four mounting rings – 28mm, 37mm, 43mm and 52mm. The Nikon and Canon 50mm lenses both take 52mm photo filters, so the DCA-Zoom tube screws directly into the lens. If your lens takes a different filter size, you will need a step-ring (available from a good camera store) to adapt to the 52mm size of the DCA-Zoom. The DCA-Zoom on the camera's lens will look and operate like a big, black sunshade, which is an added bonus.

When you are ready to take a picture, make sure that your Autofocus mechanism is turned OFF - the weight of the camera is hanging off the front of its lens, and the servomotors in the lens may not be able to take the strain. Besides, you still have to focus the scope manually. You can choose any exposure system you like (Programmed, Action, etc.) because the normal lens is attached to the camera body. Now slide the camera / DCA-Zoom down over the scope eyepiece, and lock it in place with the thumbscrew. Focus the scope on the subject, check the exposure information to make sure your shutter speeds are high enough, and hit the shutter! To zoom the eyepiece, loosen the thumbscrew for the outer tube, hold the camera stationary while twisting the lower end of the inner tube (try it – it's less complicated than it sounds) to zoom. Then re-tighten the thumbscrew and resume shooting.

Once you are done taking pictures, loosen the thumbscrew on the outer tube and remove the camera from the scope. It's that simple.

What are the disadvantages of using the DCA-Zoom instead of the TLS 800? The TLS 800 has better optical quality, especially if you are interested in making large prints. The camera / DCA-Zoom combination does not pass as much light through to the sensor, due to adding more lenses into the optical path, which will make shutter speeds drop. Also, since the magnifications start at 30x and go up, camera shake becomes more of a problem. At this time, I'm using the DCA-Zoom for most general shooting, then switching to the TLS if I have the opportunity to get some really outstanding shots.