

DIGITAL PHOTOGRAPHY

skills °

THINK SMALL. IF YOU EVER MEET A TROPICAL DIVER WITH A HOUSED SLR CAMERA, IT'S AN UNFAIR BET THAT THEY'LL HAVE A 100/105MM MACRO LENS WELDED IN THERE. IN FACT I THINK THAT THE SLR LENSES MOST USED UNDERWATER HAVE TO BE THE LONG MACRO LENSES. WHY? BECAUSE IT'S MUCH EASIER TO FIND SMALL SUBJECTS THAN BIG ONES, EASIER TO GET CLOSE TO SKITTISH SUBJECTS AND IT'S MUCH EASIER TO USE TTL AUTOMATIC EXPOSURE WITH SUCH LENSES.

FOR THOSE OF YOU WITH NON-SLR HOUSED CAMERAS, YOU'LL PROBABLY FIND THAT MOST OF YOUR SUBJECT MATTER WILL BE SMALL OR 'SMALLISH'. WHILE YOU MAY HAVE A GO AT LARGE SUBJECTS SUCH AS REEF FACES, SHIPWRECKS AND SHARKS, YOU'LL FIND THAT THE CLEAREST, CLEANEST, MORE COLOURFUL SUCCESSFUL PHOTOS WILL BE FROM SMALL SUBJECTS SHOT WITHIN HALF A METRE FROM THE CAMERA OR LESS. THE REASON FOR THIS IS THAT BOTH CAMERA SETUPS WORK BEST WITH A MINIMAL AMOUNT OF WATER BETWEEN YOU AND YOUR SUBJECT. ALSO, IN MANY CASES (BUT NOT ALL) THE SUBJECT MATTER, IF IT'S SMALL, WILL BE MORE STATIONARY OR RESTRICTED IN IT'S RANGE, ALLOWING YOU TO SIT IN ONE SPOT AND JAB AWAY AT IT.



the South Pacific and if there's a new marine dive adventure to be experienced or invented, he's always the first to put up his hand. He's also dived the southeastern Australian continental shelf and photographed shark species nobody knew would be found out there. Kelvin is a BBC Wildlife Photographer of the Year marine category winner and his unique work is on www.marinethemes.com

Kelvin Aitken is a Melbourne-based professional photographer and diver passionate about the big blue and the big sea creatures to be found out there. He's dived from the Arctic to the extremes of

Before you send any hate mail, I'm not suggesting that macro or close up photography is easy. It is, however, much easier than scouring the oceans for a big marine animal, getting within a few metres of it and having it smile for you. For you beginners out there, you have far more opportunities to learn and hone your skills on a slow moving nudibranch than a fast moving blue whale. So let's look at some of the options to get close.

SLR cameras are those cameras which allow you to see your subject through the camera's lens. They usually employ a mirror to reflect the image up through a prism, through the viewfinder and into your eager eye. The mirror flips up at the moment of exposure to allow the light to strike the film or digital sensor. Some of the small digital cameras could also be regarded as SLR's as the LCD image at the back of the camera, which you use to compose and check your image, has a direct feed from the lens. Non-SLR cameras are those that have a viewfinder that does not use the camera lens to provide you with a view. These are called Rangefinder cameras; the Nikonos system is an example. With a non-SLR viewfinder, the closer you get to your subject the wider the disparity between what you see through the viewfinder and what the lens sees. Some rangefinder cameras may provide a guide to compensate for this but this translates to educated guesswork and becomes useless at very close distances. Obviously, an SLR system used at close distances for small subjects is the best system to consider for close up work.

Depending on your camera and lens, the closest distance from the film or digital sensor that you can focus to varies from a couple of feet down to a few inches. In a worst case scenario, assume you're using a small housed digital camera with an LCD screen for a viewfinder and a closest focusing distance of 400mm. You hit the reef and the first thing you see is a colourful nudibranch ambling across the coral. Focus, compose and capture. Bewdy! On review you see the nudibranch is a hopelessly small colourful dot in your digital review image. So you zoom out to the longest focal length, shuffle forward, use the viewfinder to really fill that frame and 'click'. OK, now you have a beautifully composed, colourful, frame filling nudibranch ... which is as far out of focus as a bug crawling across your sunglasses.

What to do? Chances are that not only will your camera not be able to change lenses, but the housing will be unable to accommodate any longer lenses or internal filters. You may have a

macro setting on the lens but that designation is about as hopeful as those promises in spam emails. The only solution is to use an external diopter lens. Diopter adjustment filters come in a range of settings or diopters. A typical set of filters (you can buy one or a set of three or more) will have diopters of +1, +2, +3, or +4.

Your housing may have an external screw thread on the lens port. If so, check your manual to find the diameter. You'll be able to buy a screw-in diopter filter which you can attach and detach throughout the dive as your subject and focus distance dictates. A +1 or +2 will be your most useful choice. A +3 or higher will allow you to focus on a much smaller area but, if you have a built-in strobe, you'll probably not be able to light the subject as it will be too close for the beam angle to cover. You can always take your camera along to the photo shop and do some test 'land dives' on a small object to find what works best for you.

It's a known fact that any sort of fiddling around underwater takes 10 times as long as the same action would above water. Multiply that again if it's dark, cold or a current is present. So be prepared to spend a bit of time getting yourself set as it will take some pocket rummaging to take the filter out of its protective holder and replace it afterwards.

For you sad individuals who have progressed to the point of having an SLR in a quality housing, you can bask in your options. Inside the housing you can use macro lenses, micro lenses, diopter filters, tele converters, or

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extension tubes. As noted above, diopter filters optically change the range of focus, just like using a magnifying glass to read small print in a mobile phone contract. You can focus closer, but the lens will no longer be able to focus on distant subjects. You've simply moved the range of focus closer.

- Macro lenses and micro lenses (the latter capable of magnifications greater than life size, are rarely used) are designed to work at close distances. Any quality macro lens will focus to at least 1:2 (half life size) and usually 1:1 (life size). If



With a compact digital camera, a tight body shot like this needs a +1 diopter filter to fill the frame. A stronger +3 filter gets in nice and close. Expect a few focus failures with such small subjects so don't take just one shot.



Your basic empty metal tube extender. It is a simple device to imitate the macro lens capability of stretching the lens out for closer focus but without the ability to focus at infinity. They can also be used with macro lenses to extend their capabilities.

you're using a digital camera with a chip smaller than a 35mm piece of film then the final image will be cropped into a tighter portion of the subject, but will still have the same magnification as a 35mm or 'full chip' set-up. Put simply, a 100mm macro lens is just like a normal 100mm lens with more room to rack out. A normal 100mm lens focused as close as possible will have the internal movement stopped by the physical restraints of the lens barrel and internal focus threads. A macro lens simply has more internal thread and space to move. Of course, optically there are lots of things going on to make the optics work at greater extensions, but otherwise that's the only difference.

- Tele converters are accessory lenses that fit between a lens and the camera, converting the lens into a longer focal length. A 50mm lens with a 2x tele converter will, in effect, become a 100mm lens while still being able to focus on a distant subject. A 2x tele converter on a 100mm macro lens will now be transformed into a 200mm macro lens. In the real world, this means that a flighty garden eel one metre away will now appear twice the size or half the distance. You're effectively getting 'closer' without moving, just like switching to a longer lens or zooming to a longer focal length.

- Extension tubes aren't lenses, they're glorified toilet roll tubes. They're a simple device to push the lens away from the camera body, thereby allowing the lens to focus on a closer subject. Where a macro lens, as mentioned above, has a longer internal thread and a bit more lens body to stretch out, the extension tube supplies that extra 'stretch' or space between the camera and lens to pull the range of focus closer to the camera.

Use of any of the above converters, diopters or extenders will reduce the quality of your images. Using high quality accessories will keep the quality reduction to a minimum, probably unnoticeable. All of the above, except for the diopter filters, will

also bring in a 'lens extension' effect. This is evident in that you will need more light to provide a correct exposure as the lens racks out. The laws of physics are not to be taken lightly, no pun intended. As your lens is racked out to focus at a closer distance (either with converters, extenders or the longer focusing threads of a macro lens) there's a reduction in the amount of light reaching the film or sensor. This happens at all focused distances closer than infinity but is generally imperceptible. Once you rack your lens out past a magnification of 1:2, or half life size, the diminished light effect is much more noticeable. In theory, you'll need to open your lens 1 f-stop more at 1:2 and two f-stops more at 1:1.

In the above scenario with the nudibranch, at 400mm away the exposure was, say, f-16 with a magnification of 1:15. Now your lens is racked right out and the magnification is 1:1. The exposure now required due to the lens extension factor will need to be f-8. If you're using auto exposure and/or TTL strobes, you'll probably not notice this exposure change as the camera and strobes would have automatically compensated. In addition, you'd have moved closer to the subject, so now your light source is also closer, providing more light (the inverse square law at work as discussed in a previous article) and compensating, to some extent, for this change. The point of all of this is that the two laws of physics tend to cancel each other out. The closer you get, the more light you lose in the lens from lens extension, but the more you gain from your strobes from the inverse square law. The 'lens extension' effect doesn't come into play with diopter filters as they don't change the length of the focusing system – they just pull the focus range closer to the lens.

I'm not trying to turn your brain into mush here. If you understand these factors, when one or the other is missing (e.g. you're shooting macro with available light and your exposure keeps dropping as you get closer, or with a wide angle lens with minimal lens extension factor your strobe exposure keeps increasing as you get closer to your subject) then you'll understand what's happening and take steps to fix it. Also, tele converters change the amount of light hitting your film or sensor – another example of the laws of physics at work. You



A quick and cheap way to get closer focus is the diopter adjustment filter. Take your camera/housing along to your camera store to check which diopter power will suit your needs.

probably know that a lens with a maximum aperture of f-2.8 will provide you with more light to focus and compose than an f-4 lens. The f-stop is a mathematical expression that describes the number of times the diameter or aperture of the lens can be divided into the focal length. When you put on a tele converter the physical and optical focal length is increased, but the diameter of the lens does not so the speed of the lens drops. A 100mm f-4 lens with a 2x tele converter now becomes a 200mm lens with the same diameter which, when divided into the new focal length, becomes f-8.

When you apply any of the above systems, your lens port probably won't be able to handle the extra lens length. Sometimes even a diopter filter will hit the inside of the port. Fortunately housing manufacturers now make spacers to extend the port. You can use one or more extenders to give your lens room to move. If you aren't using auto focus, you'll also have to purchase, or make, a gear that can be reached by your focus knob.

Users of small digital cameras and some film cameras have the option to use an external clip-on diopter filter. Some housing manufacturers or third-party companies have this system for housed cameras as well. They tend to be big and clunky but they do work. They usually can be removed underwater so it gives you a little more latitude when choosing subject matter.

CLOSE UP IN THE REAL WORLD

The first step in shooting macro happens on dry land. You need to decide ahead of time what sort of set-up you'll use on the



An extension tube, a 100mm macro racked right out to 1:1 and a +3 diopter were all needed to capture this tiny pygmy seahorse, measuring about 1cm long with tail fully extended. A couple of port extenders were needed to fit the whole lot in the housing. Manual focus was used, moving the camera back and forward to get focus. Depth of field at this magnification was about 2mm. You need patience, a steady hand, your body securely propped and no current to nail one of these delightful miniatures.

next dive. Most dive sites have a variety of subjects from big to small. The choice you make will, unless you have multiple housed setups, rule out some subjects. If you're shooting macro, then you need to decide how radical do you want to go. Super macro with a 100 or 200mm lens with tele converters and a diopter or two? Or a standard zoom lens with a removable diopter to give you a less radical approach and wider choice of subject matter?

For obvious reasons dive guides hate to hear, "What will I see on this dive?". But from a photographer's point of view, it's worth sidling up to the guide before the dive brief and explain that you want to choose a lens so what subjects have been encountered on the site before? Once you have the broad strokes you can make a decision. At night on a muck dive? Reef wall with lots of pelagics? Sand flats with lots of rays? A shark feed? Accept the fact that unless you have major emotional problems countered by using five camera setups, you'll miss some subjects. Forget about that and concentrate on what you can do with what you have at the time.

If you're using a long macro lens you may benefit from a small sheet of lead. Instead of getting kinked wrists from fighting the extra buoyancy from the longer port, tape a small bit of lead sheet under the end of the port. You can fiddle with the amount until you find what suits your set-up. Also, the longer port can be a bit more difficult to handle, especially with some swell or current. The smaller the subject matter and the higher the magnification the more camera movement will give you grief. Try letting go of the left housing handle and hold the port instead, just like using a telephoto lens on land. It will cut down on the wobble, giving you more accurate framing.



Port extenders will be necessary to accommodate any addition to your macro lens. This Aquatica system has such tight tolerances that even a diopter filter needs an extender.

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There are some subjects that work best without auto focus. Once you get up to the 1:1 magnification or beyond, using the lens to focus becomes frustrating and inaccurate. You can either pre-set the focus on land and lock it there, use the focus lock with auto focus or use a geared manual focus system. Pre-set focus works well if you know what you will be shooting and that this type of system will work for you on the next dive. For example, on one trip to Loloata Island in Papua New Guinea, I knew before I left home that at on at least four dives I'd be photographing pygmy seahorses in known spots. For those dives I used a 100 macro lens with an extension tube and a diopter filter with the lens focused at the minimum and taped to prevent movement. Once I found the tinsy tiny critters I hunkered down on the reef, holding the long macro port with my left hand and moved the entire housing back and forth to get correct focus. It worked a treat.

Focus lock will help in some less extreme but still difficult macro situations. For example, when shooting a portrait you can use auto focus to lock into any spot on the animal then lock it either using a focus lock button or by holding the shutter lever half engaged. Then move the housing back or forward to place the area of sharp focus on the eye. A geared manual focus system will do the same but it means complex gears, more weight to carry around and is much slower than auto focus with locking.

With these extreme close-up situations the other factor that needs to be considered is lighting. The diameter of the macro port will restrict how close the strobes can be placed and at what angle. A ring flash system is available which works well but your normal strobes will suffice. Just make sure you use two strobes (or if your subject doesn't object, one and a reflector) and set them as close as possible to the edge of the port. A tele converter set-up usually allows a bit more room between the port and the subject which makes lighting easier. The pygmy seahorse set-up had my strobes braced right up against the end of the port as the seahorse was just a few centimetres from the flat glass port.

So, macro is not only a common form of marine photography, it also gives you a lot of options to branch out into different areas. The above is not an exhaustive coverage but will give you some ideas and push you along the right path. Have fun!

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