Reverser Ring and Extension Tubes for Macro Images

The world of macro imaging gives a whole new dimension to photography. Seeing small things up close, closer than the naked eye, has fascinated many for years! (While this is mainly aimed at DSLR users, there is a section towards the end of the article for compact camera users.)

(Image – Graham Edgeworth, Minsterworth Photographic Club)

The issue has always been "How can I afford a macro lens?" Many lenses will have a "macro" setting, but this is merely a close-up setting, and does not get you truly close!

Macro lenses can cost anything from a couple of hundred pounds, up to thousands. Unless you want to specialise in the field, is it worth paying out for a rarely used piece of equipment? Here, I examine two alternative and much cheaper methods of getting up close…

Extension Tubes

There are two affordable ways of shooting macro images, the first method is to use "Extension Tubes". These, as their name suggests are "tubes" that fit between the camera body and the lens. They contain a mount at one end to lock into the camera, and the corresponding "socket" to receive the lens or other extension tubes.

Each tube gives a larger image, dependent upon the lens you are using. They can be used singly or "stacked" to get a really close up image.

These sets are, of course, manufacturer-dependant, so, s Canon set can't be used on a Nikon as the lens mounts are different.

(Always mount them on the lens before mounting them on the camera. Make sure the camera is switched off first!)

Some have electrical connections to maintain the autofocus and aperture control between camera and lens. These are slightly more expensive.

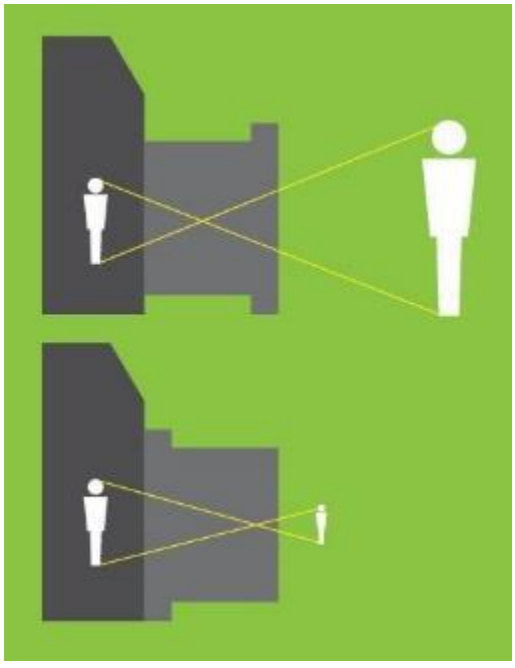
It can be seen here how much "closer" you can get to an image using extension tubes. This may be enough for the type of images you may wish to take, and, while this is a great way of getting closer, these tubes do not give a true macro image.

DSLR Reverser Ring

This is the second, common alternative to buying a macro lens.

As its name suggests, this device allows you to reverse the lens you use on your camera and mount it on your camera body "the wrong way around"! It is a metal ring that has a screw thread that that can be screwed into the filter ring of your lens. The opposite side is the camera lens mount.

So, how does it work? It's quite simple, although there are some drawbacks.



If you already own a 50mm prime or standard kit lens (around 18-55mm focal length range) then reverse lens macro is also the least expensive way there is to get up close.

The reverse lens technique involves turning the lens around so that the rear element points outwards, and the front element faces the camera body.

If you haven't seen this in action before, it may seem like bit of a strange thing to do. But it works. The diagram on the left shows why. In normal use, a 50mm lens focuses light from far away so that the image is much smaller and can be recorded by a digital sensor or on film.

Reverse the lens and the opposite occurs. The 50mm lens magnifies what it sees, giving near life-size reproduction.

If you are intending to use such a mount, you need to know the filter ring size for the lens where it is intended.

This can be found on the lens itself. Usually the marking is a circle with a line through it: Ø followed by a number signifying the diameter (thread size) of the filter ring. Of my lenses, here are some of the positions of the mark:

A Sigma lens, the filter size on the lens body – 62(mm)

My usual lens – inscribed on the front face next to the lens – 77mm

On my 85mm prime portrait lens – filter size 72mm

The ring I have bought is a 77mm to fit my “usual” 24-105mm lens and my 70-200mm lens.

Ensure you buy the right size and camera manufacturer ring-type!

Image sharpness

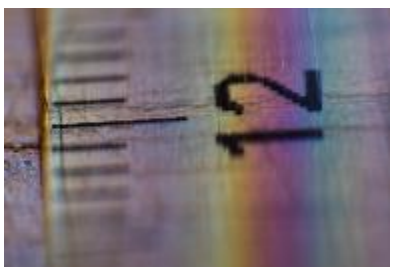
The reversed lens technique gets you so close to the subject that it's virtually impossible to hand-hold the camera. For best results, use a tripod to keep the camera steady, and a cable release to fire the shutter.

I find it best to use this set-up indoors, especially for delicate subjects like flowers. If you try it outside, the slightest breeze will move the flower and spoil the photo.

(This image shows me using my 24-105mm zoom lens with the reverser ring)

The main drawback is that many lenses today don't have a manual aperture ring to allow you to open or close the aperture manually. The lens, therefore, will use its maximum aperture, which will reduce the depth of field to a minimum.

In the image above, you can see the view I had of my lens end-cap (shown right) using the reverser ring on my 24-105mm f/4.0 lens. The focal length was set to 50mm. As I had no control over the aperture (the aperture size is f/4) I used settings of ISO 200, speed 1/80th second. (I used a tripod!)



The depth of field is about 1.5 to 2mm! (I checked it with a ruler. As you can see (left) the millimetre markings either side of the 12 are going out of focus!)

So, when it comes to shooting images with a larger depth of field, a longer focal-length lens is better. Using the same lens, but zooming out to 105mm. The depth of field is slightly greater:

For shots in the garden, I changed to my 70-200mm zoom lens. This has an even greater aperture – f/2.8, so the depth of field issue was magnified. Here I used a focal length of 100mm.

The result, seen below, while artistic, don't give the image I was looking for…

Very little of the flower is in focus as the aperture on this lens is f/2.8! However, by moving a little way back and changing the zoom to 200mm, I achieved a better image:

It is now the zoom control ring that focusses the image, the focus ring is almost redundant.

So, careful positioning, close to the subject, then using the zoom function to change the focal length allows the subject to be framed and brought into focus. Again, the focus adjustment is very small. As

you have no auto-focus, you must take care to ensure the element of the image you wish to capture is sharp. Lots of practice will produce results!

Check also for over- or under-exposure. If the image is over-exposed, increase the shutter speed, or reduce the ISO, and vice-versa for under-exposure. (Don't set your ISO too high, or grain will become evident.)

If you are using a prime lens, the focal length is fixed, so the positioning of the lens becomes more critical, as the focus range is limited. If you can get hold of an older film-camera lens with the aperture control on the body of the lens, you will have far greater control over the depth of field! To get around that, there is a second reverser ring type that joins two lenses together.

Twin lens reverse macro

This ring fits between two lenses.

Use a coupling ring (shown above) to attach your reversed lens to another lens. The reversed lens acts like a powerful close-up filter.

A reversed 50mm lens has a strength of +20 dioptres. A reversed 24mm lens has a strength of +41.6 dioptres. Considering the most powerful close-up lens I know of has a strength of +10 dioptres, you can see how powerful this technique is.

The above image shows how to use this technique. Attach a reversed 50mm lens (for example) to an 85mm prime lens. In this set-up, the 85mm lens is called the primary lens and the reversed lens the secondary lens.

You can try this with any lens as the primary lens. The longer the focal length, the more magnification you'll achieve. The important thing is that the filter thread sizes match, or are close to each other, so you buy a coupling ring that will join them together. You have the option of using a coupling ring combined with a stepping ring if you need to.

The advantage of twin lens reverse macro is that you can leave the reversed lens open at its widest aperture. You stop down the primary lens (change the f stop value) instead to increase depth-of-field.

Depending on the lens that you attach the reversed lens to, you can achieve up to 3x life-size reproduction. That's three times as close as most macro lenses.

Caring for the reversed lens

All of these reversed lens techniques leave the rear element of your reversed lens open to the elements. You should always take care with the reversed lens to avoid scratching the exposed element and electrical contacts. If you have an extension tube, that can be used to protect the reversed lens, as shown here:

Compact Camera Macro

Select Macro Mode – this is a fairly obvious first step but I'm always surprised by how many digital camera owners haven't explored the shooting modes that their camera has. Macro mode is generally symbolized with a little flower and when selected it will tell your camera that you want to focus on a subject closer to your lens than normal (the minimum distance allowed will vary from camera to camera – consult your instruction manual to find yours). Macro mode will also usually tell your camera to choose a large aperture so that your subject is in focus but the background is not.

Use a Tripod – in macro photography a tripod can be particularly useful, if you're shooting with a compact camera. Keeping your camera still not only improves your shots (getting rid of camera shake) but it allows you to play around with different settings without losing your composition.

Aperture – once in macro mode some cameras will not allow you to make many other adjustments but if you are able to play with your aperture settings it can be well worthwhile to do so. As we've covered in our Aperture tutorials, the main thing that aperture impacts is the depth of field of your shots. Choose a small aperture (big number) if you want a large depth of field with everything in focus or a large aperture if you just want your main subject in focus. In macro photography you'll probably want a shallow depth of field so select the largest aperture available.

Focusing – I find that in macro photography it is helpful to have full control over focusing – especially when you have shallow depth of fields where it is all the more important to make sure the right part of your shot is in focus. If your camera allows manual focusing select this option and manually focus on the part of our subject that is the main point of interest.

Composition – remember some of the basic rules of composition like the Rule of Thirds. Make sure your image has a main point of interest and place that focal point in a smart position in your image in order to draw the eye of your viewer. Try to select a non-cluttered or simple background for your main subject so as it doesn't compete with it visually.

Flash – in many macro shots having some artificial light is important. The challenge with compact cameras is that most give you limited control of your flash. As a result, choosing a good time of day when there is plenty of available light is probably your best bet. If you do need more light check to see if your camera allows you to pull back the level that your flash fires at. Alternatively, you might like to try diffusing it in some way (tissue paper or Sellotape over the flash for example). Another option might be to use some other source of artificial light or to invest in a reflector to help make the most of available light. Experiment with different methods of lighting your subject.

Take Your Shot – once you have your shot lined up and in focus take your shot. Make sure once you've taken it to take a good look at it on your LCD, zooming in to make sure that your focusing is sharp. Try shooting at slightly different apertures, with different compositions and focusing on different points of your subject to see what works best.

Macro Lens Attachments – some compact cameras actually have accessories available to help with macro/close up photography. These will enable you to enlarge your subject and/or decrease your minimum focal length. These might be worth investing in if you intend on doing a lot of macro work.

Self-Timer – when using my DSLR for Macro work I tend to use a shutter cable release and tripod to make sure my shots are completely still (to eliminate the small amount of camera shake from pressing the shutter). Most compact cameras don't have cable releases but a simple way around this is to use your camera's self-timer, found in the menu settings, on its shortest time setting which will similarly mean you have no movement of your camera when taking your shot (if you're taking notice of the 'use a tripod' tip above).

PS: I've used the term 'macro photography fairly loosely here. Technically 'macro photography' is actually when you produce an image where your subject is captured on your image sensor at life size (or bigger) with a 1:1 ratio.

In the case of most (all?) compact cameras this is not achieved and in fact 'close up' photography would be a better description. However, as most manufacturers call their close-up mode 'macro mode' I've used the term for the purposes of this article.