

WORDS & PICTURES KINGSLEY SINGLETON

FREEZING TIME

Fancy a shutter speed of 1/40,000sec? Then you need high-speed flash

When you start out in photography, it's common to think that freezing movement in your pictures is all about getting the fastest possible shutter speed. Of course, in some cases this is true, but when it comes to achieving the sharpest shots of moving subjects, flash is the key, and shutter speed becomes far less important.

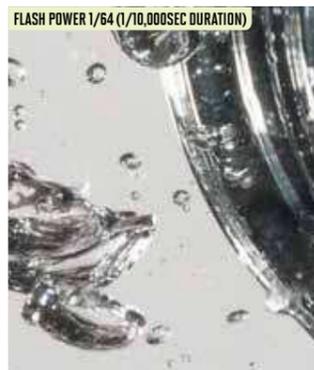
In this month's Lighting Academy we'll look at why flash is used for high-speed photography, what kit you need to do it, how to set up your camera, and how to adapt the lighting for your subject.

The set-up we've used here is designed for shooting an object as it falls into water, creating a submerged splash and bubbles – the image is then rotated and cleaned up a little in Photoshop – but the same basic methods can be used for other types of high-speed shot, like water droplets, popping balloons and so on.

While we'll touch on some of the still-life techniques used, we'll mainly be concentrating on triggering and setting the correct power of the lights, as well as how their position alters the look of the shot.



WHITE BACKGROUND SET-UP To make the background clean and white, it needs to be separately lit and at a power slightly higher than the light on the subject. Flash power needs to be kept as low as possible to freeze the movement (the final image has been rotated).



FLASH POWER 1/64 (1/70,000SEC DURATION)



FLASH POWER 1/1 (1/1600SEC DURATION)

ABOVE With one light on the background and one on the subject, we used a wireless trigger to fire the flashes and shot in continuous drive mode to get a few exposures per 'dunk'. **LEFT** At the lower powers, flash duration is shortest and sharpness is increased, but get longer as you turn up the juice.



SIDE LIGHTING



ANGLE OF LIGHT To make a dark background, the light needs to be angled away from the backdrop as much as possible. But with both side-on to the subject there's not enough fill. Moving it around to 45° helps here (the final image has been rotated, as before).

SIDE/45° LIGHTING



“IF THE FLASH IS YOUR ONLY SOURCE OF ILLUMINATION YOU CAN REALLY START TO FREEZE MOVEMENT”

How low can you go?

The most important aspect of high-speed flash is keeping the duration of the flash itself as short as possible. While this is pretty brief on all types of flash, it's quicker on some than others. When using regular studio heads, you might get something in the region of 1/1000sec at full power, and the duration gets slower as you lower the power, but accessory speedlights and some studio heads, such as the Lencarta SuperFast (SF) 300 we'll be using here, are different, getting faster as the power drops, so that you get a much faster flash duration (see 'The Kit We Used'). For instance, the SF 300 at its lowest power has a flash duration of only 1/20,000sec and a Nikon SB-700 speedlight can be as fast as 1/40,000sec, according to Nikon's figures.

Now all this will matter very little if you're mixing the flash with ambient light, but if the flash is the only source of illumination, you can really start to freeze movement. In a darkened room, only the flash exposes the subject, so you're effectively getting the

same results as you'd get with a 1/20,000sec or higher shutter speed.

Metering at high speed

So the first thing to do is ensure you're working in a dark space. Shooting at night is a good idea, but draw some heavy curtains and you can shoot in the daytime, too. As you'll see in the behind-the-scenes image, we set up a small fish tank on a table and spread some towels around it for the inevitable spillages. This is particularly important when working with flash, so extra care is needed to keep extension leads or similar well protected. Now it's time to set the exposure, but because you want the shortest possible flash duration, start there and work out the exposure from that.

The speed of the flash pulse isn't something you can dial-set in terms of fractions of a second; in the case of these units, it comes from the lowest power settings. Placed at around 2ft from the tank, we set the two SF 300 heads to a level of 5.0 (1/128 power) and, using a Gossen DigiPro F2 flash meter set to ISO 200, took a reading next to the tank. This gave f/11, which was a little too wide for the depth-of-field desired, so the flash power was increased to 5.2 (1/64 power, which still provides around 1/10,000sec), in turn giving the f/16 we wanted.

Shutter speed can then be set, and here you've got two options: fast or slow, depending on how you want to capture the subject and trigger the flash. In the darkened conditions, and with the small aperture and low ISO, even an exposure of several seconds should avoid picking up the ambient light, leaving only the pulse of flash, so if you want to trigger the light manually, timing it yourself to coincide with a splash, set the shutter speed to a few seconds or use Bulb mode. It's worth a test shot here, without the flash, to make sure no ambient light is picked up.

The other option is to use a faster shutter speed, typically around 1/125sec or 1/200sec, much as you normally would in a studio shoot. The benefit here is that you're absolutely sure of a dark frame without the flash, and that you can also shoot several frames of the same splash using your continuous drive mode. >

THE KIT WE USED

What's important here is flash duration – the speed at which the light enters and leaves the scene, thereby freezing the movement. Regular variable-voltage studio flash heads have slower flash durations than lower-powered speedlights, which is why the latter are preferred. The faster times come from the use of IGBT (Insulated-Gate Bipolar Transistor) technology. This cuts off the power very, very quickly compared to variable-voltage heads, which trail off, so you can use almost any speedlight for this technique.

Lencarta's SuperFast SF 300 (and SF 600), which we used, is one of the few high-powered studio heads to use an IGBT system, so flash duration gets close to speedlight performance at low power settings, but with comparatively more juice. Plus you get a modelling light, unlike hotshoe flashguns. At £325, the SF 300 has a flash duration of 1/1600sec (1/1 power), falling to 1/20,000sec (1/128 power), as well as six stops of adjustment, dual slave options allowing

it to be used with speedlights, full wireless control via the Wavesync Commander system and fan cooling to avoid overheating when used in rapid fire mode.



FLASH TYPE Speedlights and other IGBT heads have shorter flash durations.

HOW FLASH DURATION IS MEASURED

When you see flash speeds quoted by manufacturers, the duration at each power setting is often quoted at both 't.1' and 't.5'; so, for instance, you might see 'flash duration at 1/32nd power: 1/1200sec (t.5) and 1/400sec (t.1)'. Why two ratings? Well, regular 'variable voltage' flash heads produce a pulse of light that quickly reaches its maximum and then tails off more slowly, and to measure this the 't' ratings give the time taken for the flash power to dissipate to different levels: t.5 for a 50% loss of power and t.1 for 90%. In terms of freezing flash, it's the t.1 value that's important, because although the flash power has fallen a lot by this point, there's likely to still be enough to be picked up and recorded as movement. Therefore, the faster the t.1 value, the better.

CONTROLLING LIGHT Trying several positions around the subject, as well as different levels of diffusion, there are obvious differences. For instance, with the white background unlit, and the lights on the subject only, it turns a dull grey and lacks impact. Undiffused, the edges of the panes forming the fish tank were more noticeably reflected onto the face of the clock.

Firing the flash

We opted for the second method, shooting in manual mode with an exposure of 1/200sec, f/16, ISO 200 and in continuous drive mode. This, of course, meant that the flash had to be triggered automatically, so the Lencarta Wavesync Commander TX unit was mounted in the hotshoe, along with an RX receiver in each of the two heads.

If we'd used the Bulb or slow-shutter method, it would simply have been a case of firing the shutter (preferably using a remote release), then using the Test button on the Commander TX unit to fire the flashes while it was open, before closing the shutter again. If you're using speedlights with wireless triggers for this technique, the drill is pretty much identical.

Controlling the light

Like any creative technique, experimentation in the lighting will get you the results you want. After a few more test shots to confirm the subject was in focus (we pre-focused on a ruler held within the fish tank, then set the lens to manual focus to lock it), as well as whether its movement was suitably frozen, we tried several positions around the subject as well as diffused and undiffused. Starting off with a black background to emphasise the highlights in the water, the lights were placed at either side of the tank. To keep them from lightening the backdrop, they were fitted with standard seven-inch reflectors, and diffuser caps. This worked okay, producing some good crisp highlights in the water, but on the alarm clock we were using the lighting was too oblique and didn't pick up the face of the clock well enough. To fix this, we moved the right-hand light through 45° and this worked much better, giving more fill lighting to the clock face, but retaining the sparkle from the other side light. As the light was at the same distance, no exposure adjustment was necessary. Keeping the fill light in position, we also tried the second light from behind but, due to the transparency of the water, the highlights were too strong. Trying it undiffused, the edges of the panes forming the fish tank were also more noticeably reflected onto the reflective face of the clock.

“WHEN SHOOTING PICS LIKE THIS ON A WHITE OR LIGHT-COLOURED SURFACE IT'S POSSIBLE TO LOSE DEFINITION IN THE BUBBLES”

Adding a white background

Trying a white background, the lighting set-up needs to change, exactly as it would if you were shooting a portrait with a white backdrop. We swivelled the left-hand light to strike the background, keeping it diffused to spread the light more evenly, and increased its power by about 1EV to overexpose the backdrop, turning it pure white. The fill light stayed at the same position and power.

We kept the lights diffused throughout, to avoid too many hot spots on our subject and the water. The more diffusion, the smoother the highlights will be, but it's a trade-off against flash power - the more you spread the light, the more power you'll need, unless you open up the aperture or increase ISO.

When shooting on a white or light surface, it's possible to lose definition in the bubbles. We were shooting in a room with dark walls and furnishings, but if you're shooting in a very light space, or with very large diffusers, try positioning some black deflector panels near the tank (but without blocking the lights). This will pick up in the reflections and add some crisp black lines to the bubbles.

Finally, remember that the highest power you use in the set-up will dictate the flash duration. This means that by increasing the power on the background you're increasing the length of the pulse and theoretically getting less sharp results, even though the fill light on the subject is still at the lower setting. Of course, if you mix different models of flash the same applies so, for example, one speedlight and one regular studio flash won't freeze motion in the same way that two speedlights will. ✕

NEXT MONTH: Get to know light shapers.

NO BACKGROUND LIGHT



NO DIFFUSION

