THE ESSENTIALS OF

Strobe Syncing

by **John Siskin**

Figure 1. *The mixture of sharp and blur in this image is caused by using strobes with a long shutter speed (called dragging the shutter). This was made at 1/20 second and ƒ/19 at ISO 100. The strobe is a Norman 200B.*

Syncing your strobes (or flashes) to your camera has its share of difficulties. Problems include broken cords, misfires, and, if you choose too fast of a shutter speed, an exposure that is only partially illuminated by your flash. But when flash syncing works (Figure 1), you control light. For a photographer, that's an essential power to have.

Background

A "sync" (short for synchronization) is basically an electrical connection. When a camera's first shutter-curtain finishes traveling across the sensor or film, an electrical circuit is completed, triggering the strobe. If the second shutter-curtain has already started to move when the first curtain finishes, you get a partial picture since the second curtain is covering part of the picture (Figure 2). Since strobe light actually lasts about $\frac{1}{1000}$ second, the entire exposure area needs to be open when the strobe is triggered.

This electrical connection should be simple, but there are a couple of reasons it isn't. First, the electricity in this circuit is not the actual power for the strobes—that would damage the camera. A sync voltage triggers the strobe. Thus, a switch triggers another switch that triggers the strobes. The high-sync voltage used by some older cameras can damage newer models. Wein makes a device to protect your camera called a safe sync; it separates your camera from a high-sync voltage (Figure 3).

The highest shutter speed that you

Figure 2. *The fuzzy black line at the top of the image is causzed by using too fast of a shutter speed with strobes.*

Figure 3. *The Wein Safe Sync prevents high voltages from damaging your camera.*

can use without having part of the image unaffected by the flash is called the sync speed. A few camera manufacturers make strobes that flash repeatedly, allowing syncing at higher shutter speeds—the extra flashes allow the shutter to completely travel over the sensor while light from the strobe is present. The nice thing about this high-speed sync is not stopping action, but reducing existing light in a shot. This gives you more control over the balance between daylight and strobe (called flash fill). Currently, Canon, Nikon, Pentax, and Olympus have that feature on some, not all, of their camera bodies. For it to work, you must have both a camera body and flash that are built for that feature, which is generally referred to as FP flash. This mode reduces the power of the strobe substantially: at ½50 second the power is down to 25% on one unit I checked. At ⅟500th you have only about 12% of your original power.

There are various ways to use sync to creatively mix strobes with existing light. For instance, you can stop the action with the strobe, while the rest of the picture is blurred by the existing light (Figure 1). This is called dragging the shutter. The amount of blur is controlled by the shutter speed because the flash lasts such a short time. Some cameras let you do this automatically with a setting called slow sync. Many modern cameras also give you some control over when the strobes are triggered. When the strobes go off at the beginning of the exposure it is called front-curtain sync, which is the normal way for sync to work. In this case the blur will be in front of the image. If you trigger the strobes at the end of the shot the blur will follow the sharp image. This is called rear-curtain sync. Both of these can be good image-making tools. There used to be a bunch of special syncs for flashbulbs; at least we don't have to work with those anymore (Figure 4).

Where to sync

The sync can be located in two places on a modern camera: the hot shoe and the PC terminal. The hot shoe, also called flash shoe (Figure 5), is usually on top of the camera, while the PC socket, when it is there at all, is usually on the other side of the camera from the shutter release (Figure 6). If you want to

Figure 4. *This is an old flash bulb. These things were surprisingly powerful.*

Figure 5. *The hot shoe of a Nikon FE. More modern cameras have additional contacts.*

Figure 6. *This is the camera PC connection.*

connect the camera to the strobes with a wire, you connect a PC cord (Figure 7) to the PC terminal of the camera, then plug the other end into the strobe equipment (or plug the other end into an extension and then into the strobe). There are adapters that allow you to use a PC cord with a hot shoe. Unfortunately, PC cords are delicate and often fail. Be sure to have an extra. There are also radio systems to sync your strobe; we'll get to them soon.

Most professional, off-camera strobes use one of two plugs. Most, but not nearly all, strobes use a .25×1.25-inch plug, which looks like an old style headphone plug (Figure 8). The other common plug used is a regular household plug, just as you'd find on a lamp or a blender (Figure 9). (You'll notice some of my plugs are gold plated, which is supposed to make them more reliable.) The problem with the household plug is that if you have a momentary lapse of concentration, you might plug your camera into the wall socket. This would be very bad. I had an assistant do that once. Very very bad.

An alternative is to use a radio transmitter (sometimes called a "sender") to tell the strobes to trigger (Figure 10). This requires a transmitter that attaches to the hot shoe and a receiver that attaches to the strobes, in the same way a wire from the camera would attach. The great thing is that there is no long wire connected to the camera, which makes handling the camera easier. Also, there is no high-trigger voltage to damage the camera; which is very nice. There are several kinds of radio slaves, units like the Pocket Wizard that cost between $150 and $300, or units made in China and sold on eBay that cost between $30 and $50. You can find them by doing a search for "digital radio slave" on eBay. I have one of the units from eBay; it works very well, but it doesn't always trigger the strobes at 30 feet from the transmitter. Those units have the .25¥1.25-inch plug and a PC terminal that you can attach to a pack that uses the household connector using a household-to-PC adapter.

Infrared triggers

There is another method for triggering strobes at a distance: infrared triggers (Figure 11), a system I used at one time. It consisted of a little on-camera flash with an infrared filter over the light. It fit in my hot shoe and triggered a very sensitive infrared slave that was on a strobe. I gave it up because the trigger unit ran on AA batteries and took forever to recycle. I have expensive strobes that recycle in less than two seconds, but the trigger wasn't ready for at least seven seconds. I don't like to wait.

If you want multiple strobes to work together in a single shot, they all have to trigger at once. There are devices called optical slaves that can make this happen (Figure 12). Each slave triggers a connected strobe when it is hit by the light from another strobe. I use a lot of these to trigger additional strobes on a shoot. Slaves are generally a small package of electronics encased in solid plastic. They have different connectors for different strobes: PC, household, ¼-inch headphone style, and hot shoe. These can be simple tools, and often cost as little as $15.

Their biggest problem is that slaves don't always work. The slave may not "see" enough light, for instance. The simple way to deal with this is connect the slave to a sync cord and move the slave closer to another strobe. You also can do this with a radio receiver. You can get slaves that are more sensitive; of course, they cost more. Another problem is that slaves and power packs, particularly packs that use the household-connector-type sync, need the plug put into the pack in a certain direction. The answer to this is simple: take the slave out, turn it 180°, and plug it back in. Then there are slaves that stop working. I don't know why they do this, but I check all my slaves every few months to make sure they still work. Lastly, there are situations when the strobe goes off when you don't want it to. Another photographer's strobe can trigger your optical slave, which is why optical slaves are not good for events such as weddings. (You might want to use additional radio receivers for multiple strobes if you shoot weddings.) Sometimes other things trigger slaves—I once had a problem with a flashing light on top of a forklift.

Optical slaves can be a little annoying, but a handful of them can make impossible shots doable. In the shot in Figure 13, I used four separate strobes. I

Figure 7. *This is the PC connector that fits into the camera. It is always best to have an extra.*

Figure 8. *Most monolights and strobes now use this kind of connector.*

Figure 9. *A lot of strobes still use this connector at the strobe. The problem is that it will also fit in a wall socket.*

Figure 10. *This is a radio-slave system from China. These are remarkably inexpensive. Notice that the smaller unit—the transmitter—fits on the camera hot shoe.*

Figure 11. *This is an infrared-slave set. The transmitter fits on the camera hot shoe. Unfortunately they take a long time to recycle.*

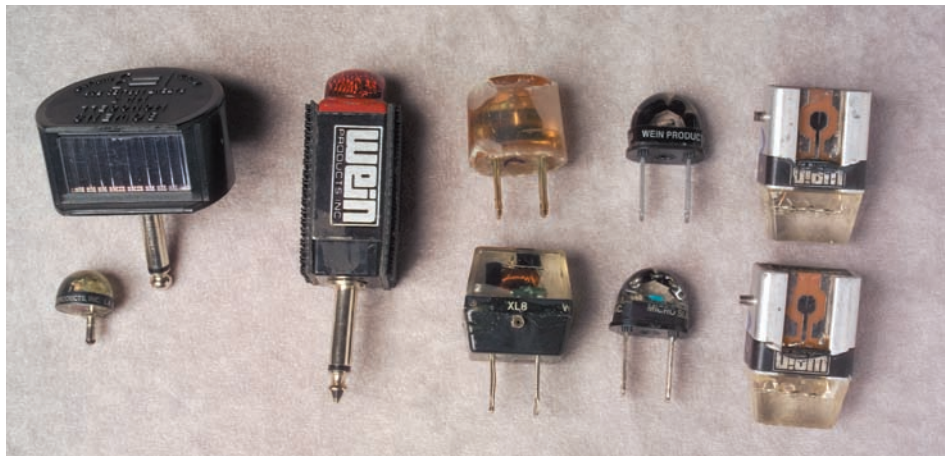

Figure 12. *This is a group of slaves including PC units, Household-Plug slaves, the .25×1.25-inch jack and hot-shoe slaves. They have various sensitivities and uses.*

Figure 13. *This shot of a large home required four strobes in different places to go off at the same time. That was achieved with optical slaves.*

couldn't have done it without optical slaves.

There are a few specialized sync systems that solve special problems. For instance, slaves triggered by sound and slaves that are triggered when an infrared beam is interrupted. These tools enable you to capture a bullet in flight (though no client has ever asked me to do that).

Syncing is the key to controlling strobes, making these vital lights easier to use in a shot. It's not difficult to sync a strobe with your camera, but all cords and slaves are subject to failure. So be sure to have a backup. ■