

## Fireworks Photography

(article by Ken Hruday)

Summer is nearly upon us, and with it, thousands of festivals and fairs celebrating the season. This is a great time for photography given the colour, crowds and excitement. Fireworks are a staple at many of these events and can be an appealing subject for photography. A lot of the attraction to fireworks comes from the massive scale of the explosions as they quickly fill the sky with colour and sound – it's impossible not to feel the awe and beauty fireworks create.

Photographing fireworks is a challenge. The light coming from a firework is many times brighter than the background. While this high contrast creates drama in a photo, the huge gap in exposure values (EV) makes it difficult to capture an image that is correctly exposed for foreground subjects as well as the firework. HDR (High Dynamic Range) techniques are typically applied to deal with wide exposure ranges but the ever unfolding and changing fireworks are not amenable to HDR. To get a good image, you'll need to resort to some post processing to fix disparities in exposure or do some compositing with multiple images.

Another problem is that a firework image captures an event unfolding in time rather than a static moment. The photographer needs to determine when to start the image how much of the event to capture. You don't know in advance what's going to happen so many of your images won't turn out – in fact the vast majority of my fireworks pictures are duds. I'd estimate that maybe 2-3% of my images are worth viewing which means that that you'll need to take several hundreds of pictures at an event to get a few good ones. If you plan to photograph fireworks you need to adopt the attitude and patience of a gold panner or a fisherman but good planning and preparation will improve your odds of success.

### What makes a good fireworks image?

Knowing what you're trying to accomplish is important to any planning so we need to ask "what makes a good fireworks image?". Having taken many hundreds of fireworks photos, I believe that fireworks pictures, by themselves, are not satisfying. Fireworks are like the colourful sprinkles on the cupcake of a summer fair, they add excitement but by themselves are not substantial enough to be a good picture.

Really interesting fireworks pictures need a strong foreground subject in addition to the fireworks display. Capturing the setting gives your fireworks picture more context and meaning. This makes the photographic challenge greater since you need to balance the exposure of the foreground subject with the much brighter fireworks. You'll also need to plan for a foreground subject when you scout your shooting location.

## Planning

### Scouting a location

Fireworks are popular – expect to be photographing in a crowd, in the dark. Accordingly you will need to get there early to scout a location with a good foreground subject and good sight lines which won't

be blocked by the hundreds of people who inevitably show up. Getting there late means you'll be setting your tripod up behind a tree or in a place where bobbing heads will crowd out the image. I like to position in an area where no one can get in the way – typically at the edge of a terrace, balcony or river bank that drops off in front of the camera. If your foreground subject is elevated, or your foreground is the crowd itself, these considerations are less critical. In any event, you'll want to setup your tripod early to stake out space before the gathering crowd makes that impossible.

## Equipment

Fireworks photography is night photography so you'll need the same equipment – a tripod, cable release and a camera with a “bulb” (manual shutter) setting. Because you'll be taking many photos, ensure you have a fresh battery and an empty memory card. Given the wide expanse that a firework explosion can encompass, a zoom lens might be helpful to frame the whole explosion in the image but this isn't necessary if you choose your shooting location appropriately.

Early arrival potentially means hours of standing in hot, mosquito infested crowds but this needn't be as bad as it sounds. Take a folding camp chair, bug spray, water and a snack. You could also take a book (or similar amusement) to pass the time although typically the presence of a tripod and camera are enough of a conversation piece that you pass the time talking photography and explaining what you're up to. Don't forget a flashlight as this is useful to find that lens cover that you happen to drop in the dark, checking your camera settings or for scanning the area after shooting to ensure that you don't leave anything behind.

## Shooting

### Camera Settings

No doubt there are several approaches to shooting fireworks, this is one I've used that works for me.

- Set your camera to capture raw images. This is usually a good idea because of the flexibility it gives you in post processing but is especially important for fireworks because of the wide dynamic range needed to capture a good image.
- Just prior to (minutes before) the scheduled fireworks, set your camera to manual exposure with a 2 second shutter and adjust ISO and aperture to get a good exposure. You'll use the determined ISO and aperture settings when you switch to “Bulb” (manual shutter release) mode. Note that 2 seconds is approximate – this will allow you to hold the shutter open from anywhere between 1 to 4 seconds which allows you to adjust the exposure +/- 1 EV in post processing to get good exposure of your foreground subject. I chose 2-3 seconds as this is about the amount of time for a firework to reach maximum burst.

If you aren't comfortable setting a manual exposure, try setting your camera to shutter priority with a 2 second exposure and use the aperture value the camera determines for you. Note that you may need to adjust your ISO setting to get the aperture and exposure into a range your lens can handle.

If the fireworks are scheduled just shortly after sunset, be aware that the light changes quickly so it's likely that your images will be more under exposed as you near the end of the show – this is why it's important to meter the light close to the start of fireworks.

- Switch the camera to bulb or manual shutter release using the previously determined aperture and ISO and attach your manual cable release.
- Disable your lens or camera image stabilization. The image stabilization system may cause issues when some cameras are mounted on a tripod. The concern is that the stabilization system is looking for camera shake and may actually create it by trying to correct something that isn't there. As a general rule image stabilization should be disabled whenever you use a tripod although some cameras can detect when they've been mounted on a tripod. Either way, when your camera is mounted on a nice stable tripod, dynamic image stabilization isn't needed so it should be disabled just to be safe.
- Higher end cameras may have a "dark frame cancellation" (Long exposure noise reduction) feature. This feature attempts to cancel out long exposure image noise by shooting a dark image for the same duration as the initial exposure. The noise in this "dark frame" is then used to cancel noise in the original frame. What this mean in practical terms is that if you expose for 5 seconds, your camera will be locked up for another 5 seconds (exposing the dark frame) thus leading to missed images and frustration. In most cases, it's unlikely that this feature will dramatically improve fireworks pictures so I'd suggest disabling it.
- Manual focus – unless you're intending to use the fireworks as a bokeh background, you'll need to ensure that you have adequate focus at infinity while ensuring that your foreground subject is also in focus. Adjusting your focus prior to shooting and setting to manual will avoid any problems with your camera's autofocus system hunting and seeking (sometimes in vain) for a focus in the dark.
- I like to lock up my mirror prior to shooting. This reduces camera vibration from the shutter but is likely a fine point given the relatively long exposure (seconds) compared to the settling time (milliseconds) of the shutter vibration. If you're not using an SLR, this is unnecessary in any event.
- Although I haven't done this, you could consider using a gradient filter (if you have one) to reduce the exposure of the fireworks compared to the lower foreground subject.

## Shooting

OK, your camera's all set and you're ready to go – what's next? Remember that you're in a crowd of excited people shuffling around in the dark. Your expensive lenses and equipment are resting on the ground near your tripod – what could possibly go wrong? Prior to the show it's a good idea to stow away any equipment you don't want to get trampled, lost or stolen.

Once everything is stowed away and safe it's shooting time. I like to aim for clean, simple bursts with little background activity. Normally I look for a shot that goes up and I open the shutter just before it hits the top of its arc. When the shutter opens I start counting, one one thousand, two one thousand, three one thousand and close the shutter when I think I've got a clean picture of the burst. Keeping the shutter open for too long will capture other stray bursts that can clutter your image and this can be a

problem unless that's your intent. Ensure that you keep the shutter open no less than one second and no more than about 5 which ensures that you can adjust the exposure comfortably in post processing. Keep in mind that these are just guidelines – it's really surprising how much latitude you have in manually exposing images like this.

Many times you can't see the tiny trace of light that presages a burst. In these circumstances you need to rely on a sense of timing to anticipate when another burst is coming. This is highly error prone, hence the hundreds of pictures needed to get a good shot.

Shooting is best when there's a slight breeze since smoke can accumulate and muddy what would normally be a good shot. Your clearest shots will normally be early in the shooting before the smoke builds up. Remember, fireworks are unpredictable so you're panning for gold here – taking 200 to 300 shots is reasonable if you want to get a few good images.

### **Post processing**

Unless you seriously under expose your foreground subject, parts of your fireworks image will be blown out (over exposed). You'll also need to address the variable exposure times (the 1 to 5 seconds) you used in the pictures. So in addition to your regular post processing routine you need to adjust your exposure. Depending on your image you may selectively adjust exposure, contrast, etc. by masking parts of the image.

I typically adjust exposure downward for the fireworks part of the image and drop the highlights to try and salvage parts of the firework. I bump up colour saturation, vibrance, etc. to restore some of the colour in the over exposed parts of the firework. Clarity adjustments can also help to clear away some of the light smoke that accumulates in the sky but – when convenient – I've also use cloning and patching to deal with annoying bits of smoke that really detract from the image.

### **Examples**

I'm still hunting the "great white whale" of fireworks pictures but here are a couple of examples of failures and successes.



This one turned out relatively well. The strong contrast of the bridge and flares in the background make it look like the bridge is on fire – there's a sense of drama and the pixie dust surrounding the main burst gives it a touch of fantasy. You can see it was a relatively calm evening as the smoke was accumulating and muddied the image a bit. The importance of getting there early is unfortunately evident in this picture as the only spot I could photograph from was behind the tree (see lower right).



This illustrates serendipity as it took hundreds of photos to get this one good image. There are no distracting side bursts that detract from these flowers although the light smoke slightly diminishes the clarity. The picture could be cleaned up a bit better with additional post processing if I took more time. When this shot was taken I had a sense I was seeing flowers but a still image like this really shows an aspect of fireworks that you can't get in the fleeting few seconds while they unfold.





Over the years I've tried to find different vantage points (and foreground subjects) when photographing the Canada Day fireworks – here's one of the legislature. Although I thought I got there early enough (2-3 hours ahead) I still had trouble finding a place to set up. Fortunately I found a spot near the edge of a railing where no one could get in the way. The picture looks deserted because everyone had moved from under the trees to see the fireworks. Note that the different colour temperature (sodium vapour lamps on the legislature vs. high temperature fireworks) create a contrast – I'm not sure whether this is good or bad but I haven't addressed any colour temperature differences in this picture. Colour temperature disparities are another consideration for post processing

Fireworks are truly some of the highlights (no pun intended) of the season. If you're going to spend a warm summer evening enjoying a fireworks display, why not take some photos as well?