

The Ultimate Flash Setup for Hummingbirds

Since writing this, consider the Yongnuo YN 560-IV Speedlites and their radio controller. You can buy 7 Yongnuo Speedlites and their radio flash controller for the price of 1 Canon 600EX-RT flash

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Go to the flickr page listed above to see hundreds of hummingbird images shot by my clients and myself, and read the discussion section to learn about our latest discoveries!



Figure 1 Male Rufous Hummingbird

I have enjoyed photographing hummingbirds over two decades with multiple Speedlites. In order to simultaneously control three or more Speedlites, I have used a variety of methods that include:

- Photoelectric slaves attached to the Speedlites
- PC cords and three-way PC Flash Connectors
- The camera's pop-up flash set to the Master mode
- Canon ST-E2 optical controller
- Another Speedlite in the camera's hot shoe set to Master
- The ST-E3-RT Canon radio flash controller

The wireless optical controls emitted by Canon's ST-E2, a pop-up flash that can be set to the Master mode, or another flash mounted in the camera's hot shoe set to the Master mode were the easiest to use and most foolproof system. Until recently, I used optical wireless controllers for all of my personal hummingbird photography. However, optical signals do require line-of-sight to work every time. If an object, such as another Speedlite, the fabric of a hide, or the metal arm of a Wimberley tripod head blocks the signal, the system can fail. Diligently checking to make certain all of the Speedlites fire makes this minor problem quick to solve, though.

All of my equipment strategies changed with the arrival of the full-featured Canon 600EX-RT Speedlite and the ST-E3-

RT radio controller. The ST-E3-RT controller (Speedlite Transmitter E-3 Radio Transmission) emits a radio signal. With the Canon 600EX-RT set to radio slave, the system works wonderfully well over a huge distance and line-of-sight is not required. This combination makes using multiple Speedlites incredibly easy to accomplish, especially outdoors where obstacles can be numerous and reflecting surfaces for bouncing optical signals are lacking. Of the many multiple flash systems I have used for hummingbirds, a set of four Canon 600EX-RT Speedlites and the ST-E3-RT controller is by far the best combination!

My equipment List for "freezing" hummingbirds in flight

- 4 – Canon 600EX-RT Speedlite
- 1 – Canon ST-E3-RT controller
- 1 – Canon 1DX Mark II camera
- 1 – Canon 200-400mm lens
- 4 – Six-foot high Flash stands each with a mini-ball on top
- 1 – Gitzo 1325 tripod
- 1 – Kirk BH-1 Ball head
- 1 - Wimberley Sidekick

- WH-200 Wimberley Head Version II (\$600) works even better for this

Camera Choices

Any Canon DSLR is effective for hummingbird photography. I shoot the Canon 1DX and now the 1DX II. The full-size sensor of the 1DX Mark II allows me to compose a slightly looser composition to reduce the chance of cutting off a wayward wing tip or tail. When I process the image with DPP 4, the image can be cropped somewhat and still have sufficient resolution. A bonus of the Canon EOS 1DX II is the fast shooting speed of fourteen images per second. Speed is crucial for ambient light hummingbird photography and considerably useful with the Canon 600EX-RT and 430 EX-RT III Speedlites, too. Although I use Canon 600EX-RT Speedlites for my own hummingbird photography, I use the perfectly adequate and less expensive Canon 430EX III's for my hummingbird photo workshops in British Columbia.

Camera Settings

Shooting Speed

Use the fastest shooting speed (images per second) possible. The maximum shooting speed with the Canon 1DX II is fourteen images per second. The *short flash duration* of the Speedlites freeze the rapidly beating hummingbird wings while allowing continuous shooting over several images without seeing a drop in the exposure. I regularly shoot ten consecutive images in less than one second without underexposing any of the images when using the Speedlites on manual at the 1/32nd power level, and far more are possible when set to 1/64th power.



Figure 2 Male black-chinned hummingbird with fill flash and ambient light.

White Balance

White balance is easily modified with software, and some sources suggest using Auto WB all of the time. Since the hummingbird is entirely illuminated with the light from Speedlites (no ambient light), it makes sense to set the Flash white balance option to match the light. However, there is very little difference between the Flash white balance and the Sun (called Daylight by Canon) WB, so it is a minor point.

Shutter Speed

To photograph hummingbirds with multiple Speedlites only, set the maximum sync speed on the camera. With small sensor cameras, such as the Canon 7D Mark II, it is 1/250th second. With full-size sensor cameras, it is a slightly slower shutter speed of 1/200th second because the shutter curtains must travel a slightly longer distance. At the maximum sync speed as much ambient light as possible is eliminated. This reduces the chance of ghosting which can happen if the ambient light is strong enough to record on the sensor. This causes a burry image of the hummingbird from ambient light to be superimposed with a sharp image from the Speedlites.

To further reduce the potential for ghosting, photograph hummingbirds where or when the ambient light is diminished. Photographing under the shade of a large tree or roof on an open deck is effective. I usually photograph under a covered porch that is open on two or three sides, but sometimes use temporary carports erected for photography to reduce the ambient light. It is also possible to photograph in an open yard at the beginning or end of the day when the ambient light is naturally dim.

LCD Display

Typically, I prefer to have the image just shot appear automatically on the camera's rear LCD. However, when shooting consecutive images when the ambient light is dim, having bright images appear on the LCD is distracting. For this reason, I turn my LCD off, or to a much darker level, to prevent it from automatically showing the image just shot and distracting me while shooting. Should I need to see that image, I press a button on the rear of the camera to make it appear on the LCD.



Figure 3 Panning the camera to make the single AF point coincide with the head of this female rufous hummingbird sharply focused the bird.

Focusing

Although the hummingbird is attracted to a small sugar water feeder, they do move left, right, up and down a little, even as they sip sugar water from the feeder. Set the camera to AI Servo (continuous autofocus) to enable the camera to adjust the focus automatically as the hummer moves a little closer or further away from the camera while hovering.

I am a huge fan of back-button focusing and have regularly employed the precision of that method for twenty-five years, but when photographing hummers in flight only, it is more convenient to have the autofocus on the shutter button. Then you don't have to bother with simultaneously holding in the button to activate autofocus while pressing the shutter button to shoot images. I prefer to use a single active AF point. I use a control on the rear of the camera to make the AF point that most closely coincides with the hummingbird's face be the active one. However, if you find it's hard to keep a single AF point on the hummers face, selecting another focusing pattern that includes a single AF point and its surrounding neighbors is quite effective. I find most of my hummingbird workshop clients favor using several active AF points.

F/stop (Aperture)

F/stops from f/16 to f/20 work best for hummingbirds. Since hummingbirds are tiny, plenty of depth of field is

necessary to get most of the bird sharply in focus. Avoid f/32 because the overall image sharpness declines significantly due to diffraction. Increasing the overall sharpness of the bird can also be improved by composing the hummingbird to make it a little smaller in the image than you would prefer. Reducing magnification in turn increases depth of field. Later during the image editing process, crop the image somewhat to once again make the size of the hummingbird pleasing. Don't rely on cropping too much, though. In other words, don't compose the hummingbird too small in the original image.

Canon 600EX-RT Speedlites

These Speedlites are especially suitable for hummingbird photography for several reasons.

- Power

The 600EX-RT Speedlite sports a Guide Number (GN) of 60 meters at ISO 100 when the flash head is zoomed to 200mm. It is helpful to begin with plenty of light output because freezing hummingbird wings requires incredibly short flash durations that are available when the Speedlite is fired at either 1/16th or 1/32nd power. I often use ISO 400, which doubles the guide number to 120 meters.

I am now using the 1/64th power setting more often to capture far more images which greatly increases the chance of capturing a truly spectacular pose. Why 1/64th power? The flash emits one stop less light than the 1/32nd setting. This enables the Speedlites to replenish themselves fast enough where long continuous bursts of images can be shot that are optimally exposed. I can now easily shoot more than a dozen images in one second or less and every single one is optimally exposed.

- Zoom Head

Zooming the flash tube to 135mm or the maximum 200mm focal length concentrates the light emitted by the Speedlite. Zooming allows the Speedlite to be further from the hummingbird or the background. Greater distance allows better lighting and helps to keep the flash stand and the Speedlite out of the camera field of view while also permitting extremely short flash durations such as 1/32nd and even 1/64th power.

- PC Terminal

Although wireless multiple flash photography is by far the most reliable and quickest way to set up two or more Speedlites, the built-in PC terminal is useful as a backup. Speedlites can be fired with PC wires or electronic slaves if necessary. Using PC wires and slaves allows different flash models and makes to be employed in a single setup. Unlike the Canon 600EX-RT Speedlite, the less full-featured

Canon 430 EX-RT III has no built-in PC terminal. However, one can get it by adding an adapter to the Speedlite's hot shoe that has a PC terminal.

- Radio-control

When used with the Canon ST-E3-RT radio controller, setting up multiple flashes and using it is quick and highly reliable. Because line-of-sight between the ST-E3-RT and the 600EX-RT Speedlites is not required and works over a great distance, it nearly always works immediately. Of course, having it work assumes all devices are turned on, fully charged batteries are in use, and the ST-E3-RT and 600EX-RT Speedlites are all set to the same channel and ID number, the Slave Speedlites are set to Radio Slave, and the Master flash set correctly to radio Master.

- Rapid Recycling

The 600EX-RT Speedlites replenish the capacitor quickly to allow shooting consecutive images rapidly. Use only the better brands of rechargeable batteries. Charge them using a battery charger that conditions and individually charges each battery. Eneloop or Powerex 2700 AA batteries and the Powerex MH-C801D battery charger is an ideal combination. The Powerex battery charger can charge eight AA or AAA batteries at once. I also use and like very much the Powerex HM-C204W battery charger that charges four AA or AAA batteries.

- Uses AA Rechargeable Batteries

Both the 600EX-RT Speedlite (4 batteries) and the ST-E3-RT radio controller (2 batteries) use easy to find disposable or rechargeable AA batteries.

Battery Charger

It is tempting to use disposable AA batteries to run your equipment, but I advise otherwise. Buying AA batteries at stores in remote areas could mean the batteries have already lost much of their charge. Plus, disposable batteries tend to lose their power slowly. Everyone wants to get their money out of the batteries they buy, so they wait until the batteries don't fill the capacitor at all. Unfortunately, near the end, users waste too much time waiting for the ready light on the Speedlite to illuminate. Outstanding shots are often lost during this waiting period. Using high-quality rechargeable AA batteries is the best way to go. After each major shooting session, recharge all of the batteries to start the next photo session with fully-charged batteries.



Figure 4 A single flash is used as the main light. The ambient light is about 1 stop underexposed. The male rufous hummingbird is perched on a cone that was placed with a plamp right in front of a feeder.

Being able to charge all eight batteries at the same time in only a couple of hours is essential for hummingbird photography where four Speedlites and a total of eighteen AA batteries are in use simultaneously. Eighteen batteries? Did I count wrong? Each 600EX-RT Speedlite uses four AA batteries—a total of sixteen. The ST-E3-RT controller uses two AA batteries. That is a total of eighteen batteries!

You will be surprised at how many flash images you can shoot with a single set of fully-charged batteries. While the specs might say the batteries can produce 170 full powered flash exposures and that is unimpressive to you, using short flash durations of 1/32nd or 1/64th power allows those same batteries to produce well over a 1500 flash images before they need to be recharged.



Figure 5 The wings are allowed to blur on this male calliope hummingbird by using the longer flash duration at 1/4 power.

ST-E3-RT

The Speedlite Transmitter Master controller runs on two AA batteries. Slide the device into the camera hot shoe correctly orientated. Not sliding the device fully into the hot shoe is a frequent cause of malfunction among new users. This transmitter only sends radio signals, so it will not work with other Canon Speedlites—such as the 580 II and 430EX. As I write this, it works with the Canon 600EX-RT Speedlite when that unit is set to radio slave. However, the newly introduced radio-controlled Canon 430EXIII-RT Speedlites will also work!

Be sure the channel and identification number set on the controller match all of the Speedlites. Although you could use Evaluative through-the-lens (ETTL) metering for hummingbirds, I still prefer to set all of the Speedlites to Manual. Set the ratio on Menu 1 to All. Now press GR (group) on menu 1 and +/- appears. Press that button to highlight the power ratio menu. Turn the dial until the fixed index mark lines up with 1/32. Press set to select the 1/32nd power ratio. Although the flash duration at 1/32nd power is not listed in the flash manual, I know from using 1/32nd power that its short flash duration freezes the rapidly beating hummingbird wings. A bonus is the short flash duration allows more images to be shot with a set of batteries. Better yet is that several images can be shot quickly without the exposure gradually darkening.

When the 600EX-RT Speedlites are set to Radio Slave, setting Manual and 1/32nd power on the ST-E3-RT, the Speedlites are automatically set to those values. Don't be alarmed when you don't see the settings change on the Speedlites right away, as you must press the red light on the controller or shoot an image first to send the command to the Speedlites. The changes appear on the Speedlites immediately before the actual flash exposure is made.

There is one important control that can't be set with the ST-E3-RT. The Speedlite zoom control should be set to

135mm or 200mm when used to light hummingbirds. I use 135mm for both the Speedlite positioned above the hummingbird and for the one positioned below the bird. By restricting the spread of the light, it puts more light on the hummingbird, so the Speedlite can be positioned a few inches further away while still allowing use of the 1/32nd power ratio. For the Speedlite used to backlight the hummingbird from above and behind, I prefer the 200mm zoom setting because it again offers more flash to subject distance and, more importantly, restricts the light emitted by the flash to a smaller area reducing the chance of lens flare. The fourth Speedlite on the background is typically zoomed to about 80mm to let the Speedlite cast light over a larger area to more evenly illuminate the artificial background. (Note: One sight drawback of the Canon 430 models is the longest zoom setting is only 105mm.)

Memory Control

A real time saver is using the memory control on the Speedlite. When you turn the Speedlites on, they typically go back to some automatic setting such as E TTL. I prefer to use the Speedlites at 1/32nd power, Manual, and zoom the flash head to 135mm. Rather than having to set all of these each time I use the Speedlite, I set it once and go to the Memory button. Pressing the button brings up two options: Save and Load. They do exactly what it seems like they should do. Set the settings on the Speedlites that are desired, go to Memory, and press Save. When you want to use those settings again, go to Memory and press Load. It is a real time saver!

Speedlite Power Levels

Let's review and add some new photo strategies related to the flash duration. Remember freezing the rapidly beating hummingbird wings has little to do with the shutter speed. Instead, it has everything to do with the flash duration. The Canon 600EX-RT Speedlite offers the following flash durations, plus intermediate 1/3-stop increments:

1/1	1/2	1/4	1/8	1/16
	1/32	1/64	1/128	

Regrettably, Canon does not list the flash duration for each of the power levels in the owner's manual. But, from ample experience, using the 1/32nd power level will crisply freeze hummingbird motion. Therefore, any time frozen action is desired, use 1/32nd power (even 1/16th power does a fine job). It also keeps the batteries from running down quickly (I routinely shoot 1500 images before charging the batteries) and permits high-speed shooting.

However, if all of your images arrest hummingbird motion, after a while they become predictable, and the sameness becomes boring. Is it possible to use flash, freeze the hummingbird's body and sharply focus it with plenty of depth of field, while still allowing the wings to blur a little or a lot? Yes! I ran an experiment in which I shot 200 hummingbird images at 1/1, 1/2, and 1/4 power. After carefully checking the results on my computer monitor, I discovered the relatively long flash duration at 1/1 power usually blurred the wings too much and it seldom produced sharp body images, too. At 1/4 power, the body of the bird is nearly always sharp if the focus is accurate and the wings usually blur pleasingly. Of course, the wings are sharpest at the bottom and top of the stroke, when for a miniscule moment in time, they are still as they reverse direction.

A different way to sharply focus the hummingbird's body, but still allow wing motion, is to set the ambient light exposure about one stop underexposed. Then set the flash exposure to optimally expose the hummingbird with flash. The Speedlite and the rather fast shutter speed freeze the body, but the ambient fill light nicely blurs the wings. Normally the ambient light exposure exceeds the maximum sync speed, so use high-speed sync to allow the Speedlite to expose the hummingbird. High-speed sync works even if a shutter speed of 1/2000th second is used.

High-speed sync changes the nature of how the Speedlite works. Instead of the flash firing a single burst of light at the beginning of the exposure when the sensor is first completely uncovered, the Speedlite fires a series of flashes very rapidly. Why? When using shutter speeds faster than sync speed, a narrow slit created by both the first and second shutter curtain passes over the sensor. At no time is the sensor entirely exposed. To expose the entire sensor, the Speedlite fires a rapid series of small flashes as the slit moves across the sensor. However, the ability of the Speedlite to light distant objects is greatly diminished during high-speed sync, but it works well if the Speedlite is close to the subject.

600EX-RT Speedlite

Since most of the settings are controlled by the ST-E3-RT, it is only necessary to set the Speedlites to Radio Slave, make sure the Channel and ID match the controller, and set the appropriate zoom setting. The Manual mode and the power ratio will automatically match the settings on the ST-E3-RT.

Placing the Speedlites

I generally use four Speedlites to illuminate hummingbirds. I refer to them as the top, bottom, backlight, and background flash. Each one is placed keeping in mind that

there is no reason to accurately measure anything. Let's describe how to place each one. Eyeballing all distances (that means guessing) is adequate. You will determine the final exposure by inspecting the histogram, and more importantly, the highlight alerts. Since I shoot only large Canon RAW (CR2) files, I always continue to add light until I finally get a couple of blinkies in the hummingbird and use that exposure to the shoot. When shooting RAW, the first blinkies that appear to do mean the area is overexposed. Always remember the camera renders an embedded JPEG so you can see the image on the LCD and this JPEG is used for the histogram and highlight alert display. When the camera processes the RAW data to produce the JPEG, it tends to do things that make it seem like a highlight is overexposed, but the RAW data is not truly overexposed. Most cameras can accept one more stop of light once the first blinkies appear before RAW data is truly overexposed. By stopping with the first blinkies—which are easy to see—you will certainly not overexpose data and there is much less chance of underexposing the image to unacceptable levels.



Figure 6 Our flash setup.

Top Speedlite

Using a light stand with a mini-ballhead, place the flash about sixteen inches above the spot where the hummingbird will be when it feeds at the sugar water feeder with a downward angle of twenty degrees toward the camera. In other words, the Speedlite should light the top and front portions of the bird. The angle of the flash position enhances the chance of catching excellent colors in the iridescent feathers. This is especially important for male hummingbirds because they typically have large areas on the throat that produce iridescent colors when

the light and viewing angle are precisely correct. An occasional female hummingbird may also have iridescent spots or patches.

Bottom Speedlite

Since all of the light illuminating the hummingbird is from the Speedlites and little to no ambient light is captured by the camera sensor, the light is inherently high in contrast. A single top flash will fail to light the bottom of the hummingbird because the top of the bird blocks the light. To avoid high contrast black shadows, place the bottom Speedlite slightly below the imaginary line between the camera and the hummingbird. Keep the flash close to this line, so that it fills in the shadows created by the top flash. Use a slightly greater Speedlite to subject distance—perhaps 20-24 inches. The greater distance allows soft shadows to appear on the underside of the hummingbird. This makes the hummingbird appear more three-dimensional.

Backlight Speedlite

The backlight rims the top of the hummingbird and helps to prevent dark shadows in the wings. Place it slightly above the hummingbird and behind it, but off to one side so the Speedlite and supporting flash stand do not appear in the image. If you prefer a stronger rim light, move the Speedlite a little closer. To reduce the rim light brightness, move the Speedlite a little further away. After a couple of tries, you will pinpoint the optimum distance and angle. Of course, moving the Speedlite only works if used in the Manual mode. If using the Speedlites with E TTL, then exposure compensations must be made with the FEC or flash exposure compensation control.

Background Speedlite

The most advantageous location for the background Speedlite is below the hummingbird and pointed up at the background. Put it between the hummingbird and the background and point it upward to light the middle of the image when you photograph the hummingbird. In this position the light more evenly illuminates the background and both sides of the image are equally bright. Placing the Speedlite to the far right of the background causes the right side of the background to be more brilliantly illuminated than the left side. Obviously, a left side position does the opposite.

However, if you are careful, placing the background flash on one side works just fine, especially if you use a long focal length lens of 400mm or longer. Why? The longer the focal length, the narrower the angle of view, and the smaller the background that is captured in the image. Smaller background real estate is easier to light uniformly!

The most common mistake is pointing the Speedlite directly at the background from the camera height. Frontal flash aimed directly at the background often causes glare which appears in the image as bright white or gray blobs. Changing the Speedlite angle to the background will solve the problem. When using glossy photo prints as the background, glare is a frequent problem. In addition to adjusting the Speedlite angle to the background, often glare is eliminated by tilting the background forward or backward and/or turning it slightly to the right or left. When the Speedlite angle to the background and the background angle are adjusted correctly, glare can always be eliminated, so don't give up.

Background glare is much easier to manage when matte photos or paintings are utilized as the background. I have had excellent success using semi-gloss photos that are sprayed with a reflection reducing spray.



Figure 7 This female black-chinned hummingbird is photographed with ambient light only.

Flash Exposure

The first thing to do is set the camera to manual exposure. Using aperture-priority, shutter-priority, program, or any other exposure method besides manual lets the camera try to expose the situation with ambient light. With this technique, ambient light is to be excluded as much as possible, and the best way to do that is use manual exposure, stop down the lens to f/18, use the camera's maximum sync speed, use a lower ISO, and photograph the hummingbird in a place or at a time when the ambient light levels are low. Allowing ambient light and flash to mix will cause ghosting.

I prefer to use Manual flash at 1/32nd power to ensure all of the Speedlites fire using the same flash duration. This is especially crucial for photographing rapid motion such as hovering hummingbirds. When you set the three Speedlites illuminating the hummingbird to 1/32nd power, but use 1/8th power to force the Speedlite to emit more light intending to illuminate a large background area or a smaller area from a greater distance, you will create odd shadows along the wings. The reason? Using 1/8th power

to light the background forces a longer flash duration than the Speedlites lighting the hummingbird at 1/32nd power. The result is that the background Speedlite emits light longer in order to optimally expose the background. In reality, the rapidly beating wings move a little while the background Speedlite is still lighting the background, causing a small portion of the background that is now shielded by the wings from being optimally exposed and this small area turns out dark in the image.

Manual flash exposure does not offer any automation. When the 600EX-RT Speedlite receives the radio signal from the ST-E3-RT controller, the Speedlite almost instantly emits the light. There is no through-the-lens flash metering and no pre-flash. It is reasonable to assume you must buy an expensive flash meter to help determine the optimum exposure. In the film days, this was mostly true, and I have two flash meters from those days. While I still own both meters, I never use them for hummingbird photography. Instead, I set each Speedlite at the approximate distance and zoom setting I suggested in this article and set ISO 260 or ISO 320, f/18, and the maximum flash sync speed that is 1/200th second with the Canon cameras I use. I focus on the flower where the hummingbird will appear and take a shot. If the histogram shows data climbing the right wall of the histogram and/or the highlight alert is flashing, I know the image might be overexposed. Any overexposure problem is quickly solved by reducing the ISO, moving the Speedlites further away from the target, zooming the flash head to a wider focal length, or stopping the lens down more. If the exposure is too dark, then reduce the Speedlite to subject distance, zoom the flash to a longer focal length, use a larger aperture, or increase the ISO. Usually one adjustment or a combination of two exposure adjustments quickly, efficiently, and precisely produces the optimum exposure. I routinely make the change with the ISO or the flash to subject distance.

Once an exposure is made of the hummingbird, next I carefully look for any blinking highlight in the image that appears on the LCD display. To be sure, make certain the highlight alert is activated because the camera's default setting may be to not show blinkies. If many blinking areas are present in the lightest hummingbird's feathers, then reduce the exposure progressively until only a few blinking highlights appear in subsequent images when shooting RAW. When shooting JPEGs only, then expose to make the histograms rightmost data approach the right wall of the histogram, but do not let it climb the right wall and don't allow any blinkies.

I shoot RAW images only and process them with Canon's own Digital Photo Professional software (DPP4) that comes free with the camera. While many believe that

blinking highlights are definitely overexposed, in most cases they are not. Remember that both the histogram and the highlight alert are based on how the camera renders the RAW data to produce a JPEG. During this process, the camera tends to show overexposure warnings before the RAW data is really overexposed. Since flashing highlights are much easier to see than the rightmost histogram data, I adjust the exposure until I do get a small amount of flashing highlights or "blinkies."



Figure 8 A hum-button is hidden behind the blossom. We found that hum-buttons are terrific for setups because they are easy to hide. This provides angles that we have never been able to get on hummingbirds in the past. Here's a female rufous hummingbird hovering above a bergamot.

Camera Shooting Speed

When the Speedlite emits light, the capacitor fully or partially empties which must be replenished to shoot another fully-powered burst of light. Replenishment processing time is referred to as the *recycle time*. With fully-charged batteries, firing a maximum burst of light may require a few seconds to return the flash to full power before another maximum burst can be fired. Battery recycle time prevents rapid shooting. At best, it may be possible to shoot one image every two seconds when the Speedlite emits all of its energy with a full-powered burst of light. To freeze the motion of the hummingbird's wings, use the 1/32nd power level which emits a mere twinkle of light for a brief period. With the Canon 1DX Mark II, the 1/32nd power level allows using the motor drive to fire off several images in less than a second while still maintaining the optimum exposure! It is an enormously important technique to use with speedy hummingbirds because they often assume terrific poses when they see the first flash of

light or hear the shutter click. Many exceptional poses are captured after the first exposure in a short high-speed burst of images.

Always one to push the limits, if I can capture twelve optimally exposed images at 1/32nd power with my camera, how many can I get if I used 1/64th power? I tried by zooming the flash heads to 200mm and moving the Speedlites a few inches closer while using 1/64th power to see if it was feasible. I discovered that I could shoot continuously for as long as the hummingbird hovered in front of me. I never got a black (unexposed image) frame because the flash always had the power it needed. This shooting speed comes in handy when photographing hummingbirds, especially so where few are visiting the setup.



Figure 9 Flash isn't always required for hummers. This male black-chinned hummingbird is entirely lit with ambient light.

Lens Selection

For most of my hummingbird photography career, I used the Canon 300/4.0 lens with a Canon 25mm extension tube to enable the lens to focus closer. This combination permits the frame to be filled with a tiny calliope hummingbird. The lens is exceedingly sharp and focuses quickly. A drawback, though, is it is a fixed focal length 300mm lens. If set up to photograph a calliope hummingbird and a larger black-chinned hummingbird arrives, I have to pull the tripod-mounted camera back a few inches to avoid cutting off the wing tips or tail. If set up for the larger black-chinned hummingbird, filling the image with the smaller calliope hummingbird means pushing the tripod forward a few inches. Even if all of the hummingbirds are the same size, sometimes two birds appear at the flower simultaneously and once again I have to pull the tripod back which sometimes scares one or both birds. The problem of a fixed focal length lens hit home at Tandayapa Lodge in the highlands of Ecuador when fourteen hummingbird species that varied widely in size regularly visited the photo station. I changed my composition from one to the next literally by physically

getting myself up and moving my tripod back and forth over a distance of three feet. Now that is a physical labor intensive work out!

My workouts ended when I switched to the awesome Canon 200-400mm telephoto zoom with the built-in 1.4x teleconverter. To photograph hummingbird species of varying size, I only had to zoom to 400mm to set the composition rather than moving the tripod to and fro. When a smaller species arrives which requires a little more magnification, I flip the switch to insert the built-in 1.4x teleconverter into the optical path which perfectly fills the image. Initially, I thought that zooming the lens to 350mm for the larger species made sense. When a smaller hummingbird arrived, I planned to zoom the lens to 400mm. However, zooming the lens is far more troublesome and the extra hand movement tends to scare flighty hummingbirds. Instead, using the teleconverter works much better!

By the way, I must stress that longer focal lengths work best for hummingbirds. Although many species are quite tolerant of being near you, photographing them with a shorter lens such as a 200mm macro or a 70-200mm zoom is fraught with problems. The short working distance forces you to be extra quiet and motionless to avoid scaring the bird. Even worse, often you are almost touching the Speedlites with the short working distance. Even if those problems are solved, the biggest problem is too much angle of view. The lens sees too much background making it harder to keep everything that appears in the image on the artificial background. If part of the image along one side covers an area off the background, it goes black. Therefore, the 300mm focal length is really the minimum length for hummingbirds. Lenses with greater focal lengths work far better!

Hummingbird photography with multiple Speedlites is initially challenging. Nevertheless, once you become proficient with the Canon equipment and placing the Speedlites, it becomes rather straightforward to make captivating hovering hummingbird images that are sharp, well-exposed, and beautifully illuminated. And once you become proficient at freezing the hummingbird's wings, then you can try other combinations. For example, using the Speedlites at ½ or ¼ power lets you capture hummingbird images at f/18 where the body is sharply focused, but the wings are pleasing blurs because the relatively long flash durations don't freeze the wings. And then you can mix ambient light and flash together, either using main flash or fill flash techniques to produce even more natural appearing hummingbird images. There are endless combinations that work well. Enjoy your exploration and adventures with these wonderful creatures. You may well become addicted to it!

A Less Expensive Alternative

Yongnuo Speedlites work well for hummingbird photography at a fraction of the price of Canon Speedlites. As of May 2016, to save big bucks, consider getting the generic Yongnuo YN 560-IV. Each Speedlite is only about \$70, but is perfectly adequate for hummingbirds. There is no TTL flash metering, but that is fine for hummers since you want to use manual flash at 1/32nd power. Dedicated radio controls for these Speedlites are made for both Canon and Nikon. One of my clients had a set for Nikon, and we found that installing the YN – 560 Manual Flash Controller for Nikon worked perfectly well with my Canon camera. The master controller is about \$45. So for about \$350, you have four Speedlites and a wireless controller!

Gerlachs' Hummingbird Photo Workshops

I teach hummingbird photo workshops at the Bull River Guest Ranch near Cranbrook, BC during mid-May to early June every year. The dates for the 2017 hummer workshops are May 14-20 and 21-27.



Figure 10 - A female rufous hummingbird with natural light only from the ranch owners deck.



Figure 11 - All flash is used to make this image of a female black-chinned hummingbird.



Figure 12 - Notice the numerous dots on the throat of this calliope hummingbird.



Figure 13 - A female calliope hummingbird with all ambient light on an overcast day.