

Rico Pfirstinger

THE Fujifilm X100F

101 X-Pert Tips

to Get the Most Out of Your Camera



rockynook

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1. YOUR FUJIFILM X100F

To start off, here's a brief overview of the buttons and controls on your Fujifilm X100F:

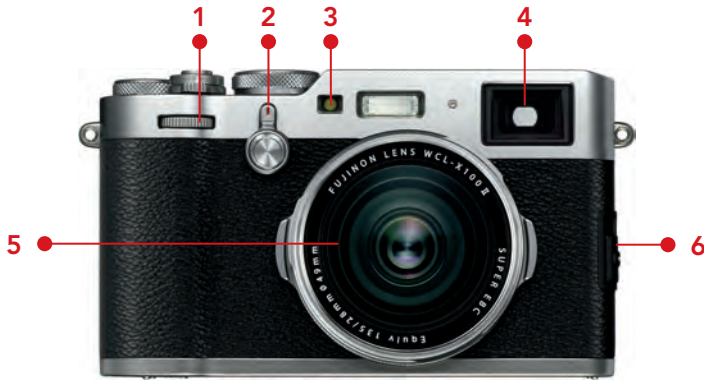


Fig. 1: X100F frontal view: front command dial with integrated button (1), viewfinder selector with integrated Fn button (2), AF assist lamp/self-timer indicator lamp (3), hybrid viewfinder (4), 23mmF2 lens (5), focus selector at the side of the body (6)



Fig. 2: X100F top view: on/off switch (1), shutter release button (2), Fn button (3), exposure compensation dial (4), shutter speed dial with integrated ISO dial (5), hot shoe (6), aperture ring (7), focus ring (8)



Fig. 5:
Some **third-party chargers** can get their power from more than one source, such as power outlets, USB ports, and car cigarette lighter jacks.

Turbo-charge your camera and its built-in buffer memory by using the fastest **UHS-I memory cards** available. SanDisk offers cards with a very good write speed of approximately 90 MB/s.

Fast memory cards give your camera an overall speed boost in shooting mode *and* playback mode. Almost everything becomes snappier and more reactive.



Fig. 6:
Fast **SanDisk Extreme Pro** SD memory cards with a 95 MB/s read and 90 MB/s write speed are popular workhorses for many serious X-series users, and are my recommended option for your X100F.

Important: *The X100F doesn't support the faster UHS-II SD card standard, so using such cards is not only a waste of money, it could also result in subpar performance. A very fast UHS-II card isn't necessarily very fast in its UHS-I fallback mode.*

TIP 3

How to obtain and install the latest firmware

- In order to check which firmware version is installed in your camera, switch the camera on while pressing and holding the DISP/BACK button.

- You can find and download the latest firmware versions for your camera online [3], where you can also find current versions of Fuji's application software, such as RAW File Converter EX [4].
- A step-by-step video guide illustrating the firmware upgrade process is available online [5]. At this Fujifilm support website, macOS [6] and Windows [7] users can also find detailed firmware download instructions for their operating systems.
- If you can't find a new firmware version on Fuji's firmware update page, there's a good chance that your web browser is still caching an older version of this page. In this case, either delete your browser cache or force your browser to reload the webpage from the server.
- Make sure that your computer doesn't change the name of firmware files you download due to naming conflicts caused by previous firmware versions that are still residing in your download folder. The correct file name of the camera firmware for your X100F is always FUPDATE.DAT.
- Make sure your battery is fully charged when updating your firmware.
- Always copy new firmware files for your camera or lenses into the top directory of your SD memory card, and always use cards that have been freshly formatted in your camera. After you have copied the firmware to the card, make sure to properly unmount the card from your computer before removing it.
- To start the update process for your camera, switch it on while pressing and holding the DISP/BACK button and follow the instructions on the screen.

- **Chromatic aberration:** Chromatic aberration [10] results in color fringing. This effect can be corrected (or mitigated) with apochromatic lenses, or digitally corrected during RAW conversion.

Some camera makers rely on dedicated correction profiles that must be provided by each RAW converter maker. Fujifilm isn't one of these companies: all current Fujifilm cameras store digital corrections as metadata in the RAW file. RAW converters can access this lens-specific metadata and use it to apply appropriate corrections. This way, the built-in RAW converter and external RAW conversion software, such as Lightroom, SilkyPix, Iridient Developer, or Capture One, can use the metadata in the RAW file to correct or mitigate vignetting, distortion, and chromatic aberration.

A major benefit of this method is that many RAW converters automatically support new lenses since Fujifilm delivers the correction data via the RAW metadata.

As mentioned, Adobe Lightroom and Adobe Camera RAW offer an additional lens correction profile for the X100F that (if you choose to activate it) is applied *on top* of the correction that is already applied based on the RAW metadata.



Fig. 7: This example was taken with an X100F and WCL-X100 conversion lens. In the left image, **digital lens correction metadata** was ignored. As a result, there's visible barrel distortion caused by the WCL. The image on the right shows the same shot, but this time with digital lens correction metadata, which is automatically applied by compatible RAW converters such as Adobe Lightroom.

The X100 series is famous for its built-in 23mmF2 lens. Many things changed and improved during the journey from the X100 Classic to the X100F, but the lens (which corresponds to a 35mm lens in full-frame terms) remained mostly the same.

For added flexibility, you can attach wide (WCL-X100 & WCL-X100II) or tele conversion lenses (TCL-X100 & TCL-X100II) to your X100F. The WCLs convert the focal length of the X100F to 19mm, the TCLs turn it into a 33mm outfit. In full-frame equivalency terms, this corresponds to 28mm and 50mm lenses. Adding a WCL or TCL doesn't impact the speed of the resulting lens, so the aperture numbers on your camera remain valid.



Fig. 8: The WCL-X100(II) and TCL-X100(II) conversion lenses are screw-mount adapters that connect directly to the built-in 23mmF2 lens of your X100F.

Optically, there is *no* difference between the older and the newer “type II” versions of the wide and tele conversion adapters. It’s just a matter of convenience—the newer versions are automatically recognized by the X100F when you attach and remove them from the camera’s lens, the older are not. Instead, you have to go to the SHOOTING SETTING > CONVERSION LENS menu and tell the camera when you attach or remove an older conversion lens (WIDE, TELE or OFF).

TIP 8 Use a lens hood!

Sadly, the X100F doesn't come with an included lens hood. However, there are offerings from Fujifilm and aftermarket manufacturers. Apart from its optical benefits (especially the reduction of flare in backlit scenes), the hood protects the lens and the front glass element from damage.

Lens hoods can pose problems, too: they make the lens appear bigger than it actually is, and they can shade the camera flash or the autofocus assist light.

My personal choice of lens hood is the original Fujifilm LH-X100. This hood comes with an AR-X100 adapter ring and is compatible with the WCL-X100 and WCL-X100II wide-angle conversion lenses.



Fig. 11: My X100F with an installed LH-X100 lens hood

The 23mmF2 lens in your X100F is susceptible to lens flare, especially when you shoot against a bright light source like the sun. This can result in a decrease of contrast, which can add a “dreamy look” to a scene. If you don't like that, try to shade the lens from the light source with your hand, or add contrast during post-processing.



Fig. 12: Shooting against the sun with an attached WCL-X100 can cause the resulting image to lack contrast, like in this example (left). To compensate, you can add contrast and darken shadow tones in RAW post-processing (right).



Fig. 13: You can also add shadow contrast in-camera by increasing the SHADOW TONE setting in the IMAGE QUALITY SETTING menu before shooting—or later during playback in the RAW CONVERSION menu.

Lens protection filters—yes or no?

TIP 9

Digital cameras like the X100F don't require the UV or skylight filters that used to be very popular in the days of analog film photography. This means that a permanently affixed filter has no optical purpose on your X100F, and only serves as protective glass. This additional glass can have a negative effect on image quality, especially for night photographs or photographs shot against a bright light

TIP 12 Recommended settings for your X100F

There is no perfect set of basic camera settings that could suit all users in all situations. However, the following settings will allow you to use the X100F in a flexible manner with good overall performance:

- **Auto-ISO** is a convenient option with three presets that can be selected by setting the ISO dial to “A” and selecting one of three Auto-ISO choices (AUTO1–3) with SHOOTING SETTING > ISO AUTO SETTING. The corresponding Auto-ISO fine-tuning is available for each Auto-ISO preset by pressing the right selector button. There, you can adjust DEFAULT SENSITIVITY (I suggest 200), MAX. SENSITIVITY (I suggest 12800) and MIN. SHUTTER SPEED. Don’t worry: even at the upper limit of ISO 12800, images made with the X-Trans sensor are quite good. When you are using Auto-ISO, you should pick a suitable minimum shutter speed with MIN. SHUTTER SPEED. A popular setting for the minimum shutter speed is $\frac{1}{60}$ s, but you can change this parameter to anything between $\frac{1}{4}$ s and $\frac{1}{500}$ s. With fast-moving objects, faster speeds are recommended to avoid unwanted motion blur. My typical minimum shutter speed settings for AUTO1, AUTO2, and AUTO3 are $\frac{1}{60}$ s, $\frac{1}{200}$ s, and $\frac{1}{400}$ s.
- Always select **FINE+RAW** under IMAGE QUALITY SETTING > IMAGE QUALITY or in the Quick menu. This will get you high-resolution out-of-camera JPEGs (digital prints) and flexible RAW files (digital negatives). Using the RAW files, you can create a variety of diverse JPEGs with different looks and settings using the camera’s built-in RAW converter (PLAYBACK MENU > RAW CONVERSION). Specifically, you can adjust JPEG parameters such as white balance, film simulation, contrast, brightness, noise reduction, and color saturation. This enables you to create different versions of a shot from a single

RAW file; for example, you can make both color and black-and-white versions of the same image, including different contrast settings. You don't have to worry about choosing the perfect JPEG settings prior to taking a shot because you can always change and optimize those settings afterward in the camera's internal RAW converter.

- As a typical standard setting, most photographers use **single shot drive** (press the DRIVE button and select STILL IMAGE) and **single shot autofocus** (AF-S; select S with the focus selector at the side of the camera).
- The most flexible AF-S setting is **Single Point AF** (AF/MF SETTING > AF MODE > SINGLE POINT). This mode allows you to select the area of the image where the camera should be focused. To accomplish this, use either the focus stick or select AF/MF SETTING > FOCUS AREA, then use the selector keys (arrow keys) to pick one of the 91 or 325 available AF frames. You can change the size of the selected AF frame by turning the command dial. *Pressing* (not turning) the rear command dial resets the frame to its default size. Pressing the DISP/BACK button selects the central (default) AF frame. Press OK or half-press the shutter button to confirm your selection. The camera will use this frame in AF-S and AF-C modes as its focus area as soon as you press or half-press the shutter button.
- Unlike most DSLR cameras, the X100F uses a **hybrid autofocus system**: a blend of contrast detection autofocus (CDAF) and phase detection autofocus (PDAF). The main burden still rests on the CDAF, which covers all AF frames (most of the sensor area). The PDAF is only covered by the central AF frames (about 40% of the sensor area). It's faster, but only works in sufficiently good light. Both AF methods work most precisely with a small AF frame, but work faster and more reliably with a large AF frame. This leads to an obvious conflict of interest. My basic AF frame size rule is: always select an AF frame that is as large as possible, but as small as necessary.

- While displaying a RAW image in playback mode, you can press the Q button to directly access the built-in RAW converter. This function allows you to create new JPEG versions of your image with different settings.
- In playback mode, press the upper selector button (DRIVE button) to view the first of two information pages that show additional shooting parameters and the position of the focus point. This function is not available when you are using the FAVORITES display mode.
- In playback mode, you can use the focus stick as an alternative to the selector buttons and the MENU/OK button.
- Press and hold the playback button in playback mode to directly switch between the two memory card slots (while using two cards at the same time).
- For direct access to the format menu, press and hold the DELETE (“trash”) button for about three seconds. Keep the DELETE button depressed and press the rear command dial.
- Pull the viewfinder selector to the right to switch between the optical viewfinder (OVF) and the electronic viewfinder (EVF).
- Pull the viewfinder selector to the left to switch the Electronic Range Finder (ERF) window on or off.
- In ERF mode (Electronic Range Finder), press the rear command dial to change the magnification level of the small ERF window in the lower-right corner of the OVF display. There are three levels: a full view of the scene and two magnification levels.

Suggested Fn button assignments

TIP 14

Smart assignment of your X100F's Fn buttons will save you many cumbersome trips to the camera menu. To display and change the assignment of all Fn buttons in one convenient menu, press and hold the DISP/BACK button in shooting mode until the configuration page called FUNCTION (Fn) SETTING appears.

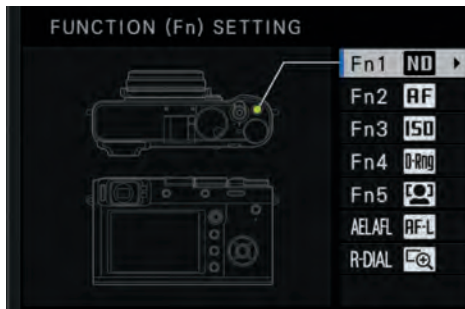


Fig. 16: Pressing and holding the DISP/BACK button for a few seconds leads directly to the **FUNCTION (Fn) SETTING** page, where you can configure the function button assignment of your X100F.

Here are my suggested Fn button assignments:

- **Fn1: ND FILTER.** The built-in ND filter of the X100F darkens the lens by 3 EV (or stops) and is quite useful to reduce the shutter speed in bright light and during flash photography, especially when you are shooting with a wide-open aperture. To quickly engage or disengage the built-in ND filter, I assign it to an Fn button, where I can instantly toggle it on and off.
- **Fn2: AF MODE.** Besides a switch at the side of the camera that allows you to choose between AF-S(ingle) and AF-C(ontinuous), there are three additional AF modes that can be combined with either AF-S or AF-C: SINGLE POINT, ZONE, and WIDE/TRACKING. In order to quickly switch between these modes, it's useful to assign their

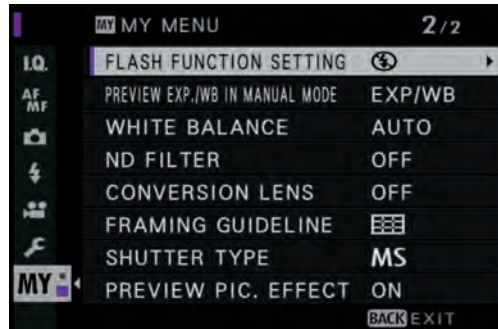


Fig. 18: The second page of my personal My Menu is reserved for exposure settings as well as general settings such as ND filter and conversion lens settings, shutter type, flash configuration, and exposure options.

Please note that manual exposure mode **M** must be enabled to access the PREVIEW EXP./WB IN MANUAL MODE setting.



Fig. 19: My Quick menu page isn't much different from the factory default setting. I always make sure that I can access the flash mode and the flash exposure compensation directly from this menu, and I like to have direct access to the shutter type setting and the exposure metering mode setting. Since I don't need quick access to the COLOR and SHARPNESS items, I replaced them with the flash configuration items.

Always shoot FINE+RAW!

TIP 16

The age-old question of whether to shoot RAW or JPEG [13] gives users of X-series cameras like the X100F a limited choice. The best option is using both formats by setting IMAGE QUALITY SETTING > IMAGE QUALITY > FINE+RAW. It doesn't matter if you consider yourself a diehard RAW shooter or a JPEG shooter.

This is how **diehard RAW shooters** benefit from shooting FINE+RAW:

- During external RAW processing, the camera-made JPEG can be used as a (sometimes hard-to-beat) reference image. Sometimes, users struggle to get better results with post-processing programs than they can get with the camera's default instant JPEG.
- Checking critical focus is only possible at 100% magnification, which only a high-resolution JPEG can provide. The JPEG that's embedded in the RAW file for preview purposes is too small. Make sure you select one of the three available L (Large) options under IMAGE QUALITY SETTING > IMAGE SIZE.
- The IMAGE SIZE menu isn't available in RAW-only mode. Different image formats, such as 1:1 or 16:9, are only available in JPEG-only mode or FINE+RAW mode. Autofocus and exposure metering adapt to the currently selected format (aspect ratio) and deliver more accurate readings when you are shooting with odd formats like 1:1. No worries, though: the RAW is always recorded in the sensor's native 3:2 format, so you don't lose any image information. Using the built-in RAW converter to generate a JPEG from a RAW file will always result in full-size 3:2 format JPEGs with maximum resolution.

TIP 18 Pick a suitable **image format!**

The full resolution of the X100F (about 24 megapixels) is only available in its native image format (3:2). However, using a different image format (such as 1:1 or 16:9) can still be reasonable. For example, some people prefer to view their images on a 16:9 HD television, while others are fans of the classic (square) medium format look.

No matter what format (aspect ratio) and resolution you choose in **IMAGE QUALITY SETTING > IMAGE SIZE**, it will only affect the JPEGs coming from your camera. RAW files are always recorded in full resolution in the native 3:2 sensor format. This means that as long as you kept your RAW files, you can generate new full-size 3:2-format JPEGs with the built-in RAW converter or an external RAW processor.

If you want to compose shots in the 1:1 or 16:9 formats, you should select the desired format in the shooting menu. Here's why:

- The live view in the viewfinder or on the LCD will automatically adjust to the new format, making it easier to compose an image.
- The camera's autofocus frames will adapt to the selected image format.
- The camera's exposure metering and live histogram are based on what's displayed in the live view. Changing the live view to 16:9 or 1:1 will enhance metering accuracy for the respective format.

The magical half-press

TIP 19

A basic rule for successfully using mirrorless cameras like the X100F is minimizing the delay between pressing the shutter button and the camera actually taking the image. It's all about not missing the decisive moment due to shutter lag.

It's up to you to anticipate these decisive moments. You should have the shutter button already half-pressed so you're ready to fully depress it to actually take the shot. By half-pressing the shutter button, you are preparing the camera: exposure and autofocus (unless you are using AF-C) will be set and locked, and the lens aperture will move to its working position. The camera is now ready to record an image with minimal shutter lag—all that's left to do is to fully depress the already half-pressed shutter button at the right instant.



Fig. 22: To make sure that your X100F is ready when you are, it's useful to prime the camera by half-pressing the shutter button.

TIP 23 WYSIWYG—What You See Is What You Get!

The EVF and LCD monitor of the X100F operate in WYSIWYG mode [14]: What You See Is What You Get. This means that the viewfinder and monitor are always trying to display a live view [15] image that closely resembles how the resulting JPEG will look. The live view simulates exposure, colors, contrast, and white balance. Plus, when you half-press the shutter button, the camera will set the selected working aperture, so the live view will also display a preview of the depth of field.

The live view’s exposure simulation is quite helpful because it allows you to recognize exposure errors before you take the picture. Please note that the live histogram is always based on the current live view image.

The live view’s WYSIWYG simulation is available in all four of the camera’s exposure modes: program AE **P**, aperture priority **A**, shutter priority **S**, and manual exposure mode **M**.



Fig. 23: WYSIWYG: This example illustrates how closely the live view (left) represents the actual JPEG from the camera (right). The live view doesn’t just simulate exposure, white balance, film simulation, and other JPEG settings, it also previews fixed dynamic range settings like DR400%.

In manual mode **M**, you can switch the exposure simulation off by selecting SET UP > SCREEN SET-UP > PREVIEW EXP./WB IN MANUAL MODE > OFF. That way, the X100F will

always display a bright live view image in manual mode, regardless of the chosen exposure parameters (shutter speed, aperture, and ISO). This can be useful in a studio setting with flash photography. For example, you may want to eliminate the surrounding-light component by stopping down the aperture and fully illuminating your subject with flash lights.

Please note that both the live view and the live histogram aren't representing the actual exposure in this mode, so don't forget to switch the exposure simulation back on with SET UP > SCREEN SET-UP > PREVIEW EXP./WB IN MANUAL MODE > PREVIEW EXP./WB if you want to work with a proper exposure simulation and live histogram in manual mode **M**.

The live view's exposure simulation is limited in situations with very low light and slow shutter speeds of several seconds. In these cases, the live view and the live histogram may appear darker than the actual result. In such scenarios, you should first take a test shot and review it in playback mode. The detail information display (which you can select with the DISP/BACK button) will show you a playback histogram of the recorded JPEG image. This includes a preview with "blinkies," which indicate blown (overexposed) highlights. Sadly, the playback histogram only shows the picture's luminance (overall brightness distribution), not its three distinct RGB color channels.

Using the Natural Live View

TIP 24

The so-called Natural Live View is a display mode that disables the WYSIWYG simulation of JPEG settings such as Film Simulation, Highlight Tone, Shadow Tone, or Color. Instead, it will display a live view image with increased dynamic range in the highlights and shadows, and with natural colors that are supposed to resemble what our eyes would see through an optical viewfinder. It will also set the live view

- **Center-weighted** metering is a crossbreed between average and spot metering. While it encompasses the entire image area, it puts special emphasis on the image center.
- **Multi** or **matrix** metering calculates a weighted average of the total light that hits the sensor. The weight is a result of 256 metering areas (the matrix) that the camera evaluates and compares to typical scenarios—which is why multi metering is considered “smarter” than the other methods. For example, multi metering is designed to recognize when you are shooting against the sun.

Average, spot and center-weighted metering return exposure recommendations based on middle gray. In other words, when you take a picture of a black wall and then a picture of a white wall, the results will look middle gray. This means:

- If you want the black wall to actually look black in the resulting image, you have to manually adjust the exposure downward.
- If you want the white wall to actually look bright white in the resulting image, you have to manually adjust the exposure upward.



Fig. 24: This illustration shows a black sheet of paper and a white sheet of paper. Both were photographed with spot metering without any exposure correction. As you can see, the camera delivered a **middle-gray exposure** in both cases. In order to get an image that reflects the actual brightness of the subject, the metered exposure has to be adjusted.

Since you have read the owner's manual, you know that Fujifilm offers a few recommendations regarding exposure compensation in certain scenarios. For example, it recommends a correction of +1 EV when you are shooting in snowfields, or $-\frac{2}{3}$ EV when you are shooting spot-lit subjects. Instead of these rules, I recommend a more precise and methodical course of action using the live view and the live histogram. To minimize corrective adjustments, it's best to select a metering method that fits the subject or the job at hand:

- **Multi** metering is a general-purpose method. Since it is supposed to be “smarter” than the other methods, there's a fair chance that you won't have to apply any corrective adjustments to the proposed exposure.
- **Average** (and, to a lesser degree, **center-weighted**) metering are rather neutral metering methods that will likely stay more consistent despite small changes in composition (or framing) than multi metering and spot metering. I recommend average metering if you want to take a series of shots of the same subject under similar conditions. In such cases, average metering will help you keep the exposure consistent.
- **Spot** metering bases its measurements on one particular spot of the overall image. This means you have to work very precisely to make sure you are metering the appropriate part (spot) of the scene. The resulting exposure recommendation will expose this spot with middle-gray brightness. For example, if you spot meter a backlit face against the sun, the metered exposure will display the face with middle-gray brightness (or zone 5 in the famous Ansel Adams zone system [17]). If that's too dark for your taste, you can use the exposure compensation dial to lift the exposure by $+\frac{1}{3}$ EV or $+\frac{2}{3}$ EV. On the other hand, if the person has dark skin, you may want to reduce the exposure with a correction in the opposite direction. It's up to

TIP 35 Playing it safe with auto exposure bracketing

As you know by now, the automatic exposure (AE) modes **P**, **A**, and **S** are responsible for selecting the correct exposure parameters. The exposure itself is the responsibility of the photographer. You can use metering (multi, center-weighted, average, or spot), the live view, and the live histogram to determine the right exposure.

Nobody is perfect! If you want to play it safe, auto exposure bracketing [29] can be a helpful feature. In this mode (DRIVE button > AE BKT), the camera takes a series of three shots in quick succession, each with a different exposure: one shot with normal exposure, one underexposed shot, and one overexposed shot. You can set a bracketing spread of up to ± 2 EV when you select the function with the DRIVE button.

Exposure bracketing is especially useful with subjects that don't move. After you've taken the shot, you can decide which of the three differently exposed versions you want to use.

TIP 36 Long exposures

Long exposures can lead to impressive results. Fireworks, night shots, interesting water surfaces, stars, or clouds: exposure times of several seconds or minutes capture the course of time in a single photograph. Of course, this only works if you put the camera on a tripod or a solid surface.

You have two basic options:

- Set the shutter-speed dial to **T** (Time) and then use the front command dial to set the shutter speed. In order to avoid camera shake, use a remote shutter release or the self-timer to take the shot.

- Set the shutter speed dial to **B** (Bulb), then press and hold the shutter for as long as you want the camera to expose. Obviously, it makes sense to use a remote shutter release that can be locked for the duration of the shot.

For good-quality results, make sure to set **IMAGE QUALITY SETTING > LONG EXPOSURE NR > ON**. By doing so, the camera will perform a dark-frame subtraction [12] depending on what ISO and exposure time you used. Dark-frame subtraction doubles the effective exposure duration, so be patient.



Fig. 26: A **long exposure** taken in T mode. Make sure to use a solid tripod and a remote shutter release for these kinds of shots.

Long exposures in bright daylight

TIP 37

In order to achieve long exposure times under normal daylight conditions, you can't just stop down the lens—even at $f/16$, your shutter speed would still be too fast. Besides, diffraction blur is kicking in beyond $f/10$, so stopping down beyond this point is only recommended when it cannot be avoided.

Regarding image quality and ISO, there's a basic rule: lower ISO settings lead to higher-quality results—hence the general recommendation to keep the ISO settings as low as possible. However, we obviously can't shoot with ISO 200 all the time, especially in low-light situations.

There are two basic methods to amplify a digital image:

- **Analog/digital hybrid-amplification *prior* to writing the RAW file:** This method applies a mix of analog and digital signal processing to amplify or push the image to the brightness level that corresponds to the ISO setting. The digitized result of this process is then saved as a RAW file.
- **Digital amplification (push) *after* writing the RAW file:** This method changes the brightness of an image during RAW processing, *after* the RAW file has been generated. The metadata (a.k.a. instructions) in the RAW file will tell the RAW converter what to do. You can also use your X100F's built-in RAW converter to adjust the brightness (and hence, ISO) of an image after it's been recorded, or by moving your external RAW converter's exposure slider.

Digital amplification during RAW processing is beneficial because it's reversible. If the amplification (exposure) is too strong, you can always adjust it back. ISO (a.k.a. exposure amplification) is a volatile aspect of the photography process because it can be changed anytime: in-camera, prior to writing the RAW file, or later during RAW processing.

The sensor in your X100F is a so-called ISOless sensor. This means there's no relevant quality difference between conventional signal amplification prior to writing a RAW file and digital amplification later during RAW conversion. This is great, because it allows you to digitally increase the ISO (a.k.a. brightness/exposure) of your shots during RAW processing, either in-camera or with external software such as Lightroom. Pushing the exposure up later in Lightroom won't look any different than choosing a higher ISO setting when you take the shot.



Fig. 27: **ISOless sensor (1)**: This shot was taken at ISO 1600, with classic analog/digital in-camera amplification from base-ISO 200 to ISO 1600. The ISO 1600 result was then burned into the RAW file.



Fig. 28: **ISOless sensor (2)**: This shot was also effectively taken at ISO 1600. However, the amplification from ISO 200 to ISO 1600 took place digitally during RAW conversion by moving the exposure slider three stops to the right. You won't be able to see any quality difference between the two shots in this book, so I invite you to take a look at the full-size samples that have been uploaded to Flickr [32].

TIP 39 What you should know about **extended ISO**

You'll notice that in addition to the standard ISO settings (ISO 200 to ISO 12800), your X100F offers three additional settings: L (100), H (25600), and H (51200).

- **H means High:** In these modes, image data is further digitally amplified. In the case of ISO 51200, the last amplification stop is performed during RAW conversion. This enormous amplification leads to a visible decrease in quality. While ISO 25600 is still quite usable (especially for black-and-white JPEGs using the ACROS film simulation), ISO 51200 is only for emergencies.
- **L means Low:** In this mode, an ISO 200 RAW that has been overexposed by one stop is pulled down one stop and saved, resulting in ISO 100 RAW and JPEG files. A digital pull is the direct opposite of a digital push operation: digital pull decreases the exposure of the resulting image. The ISO 100 RAW and JPEG files contain one stop *less* dynamic range than normal ISO 200 files. This means that bright areas, like clouds in the sky, can easily appear blown out. On the other hand, ISO 100 can add contrast and punch to scenes with dull lighting and little contrast.

Important: *Extended ISO settings are only available when the mechanical shutter (MS) is selected.*

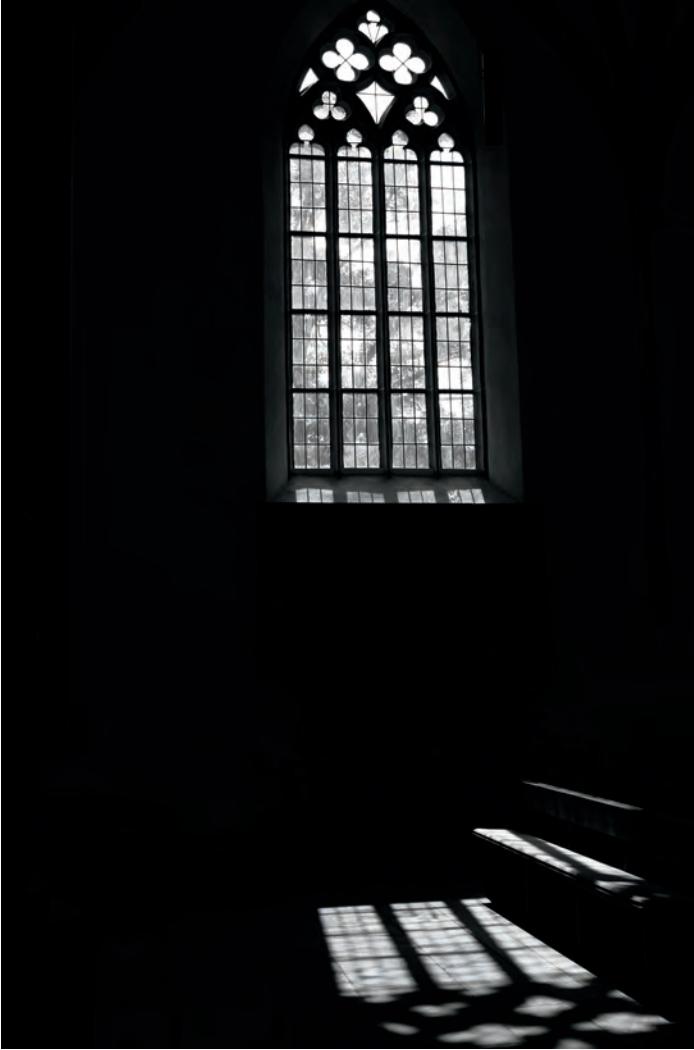


Fig. 29: Need extra contrast? **Extended ISO 100** can add punch thanks to its decreased highlight dynamic range. That said, make sure that your resulting shutter speed is fast enough to take the shot without camera shake or unwanted motion blur.

While every RAW converter is different, most programs offer functions to selectively change the exposure of a shot. For example, you can change the overall exposure with the exposure slider, and you can restore blown highlights with a highlight recovery slider. Most converters also offer sliders that only target shadow tones.

The DR function of the X100F can help you automate this tone-mapping procedure. It works in two stages:

- The RAW file is exposed one (DR200%) or two (DR400%) stops darker in order to preserve bright highlights of a scene.
- During the following RAW conversion in the camera, the underexposed shadows and midtones are digitally amplified by one (DR200%) or two (DR400%) stops to restore their correct brightness, while the (already correctly exposed) highlights are mostly left alone.

The resulting JPEG from the camera has undergone a selective exposure correction. The DR function restores the shadows and midtones of a shot that was initially exposed one or two stops darker, thus preserving the highlights of the scene. Looking at the resulting JPEGs, this leads to an effective gain in dynamic range (DR): one additional stop of highlight DR at DR200%, and two stops of additional highlight DR at DR400%.

In DR-Auto mode, the camera will automatically select a suitable DR setting. Please note that in this mode, the X100F will choose either DR100% (no highlight DR expansion) or DR200% (one stop highlight DR expansion). DR400% (two stops highlight DR expansion) is only available when it is manually selected.

You can change the DR settings of your camera in the Quick menu or by selecting IMAGE QUALITY SETTING > DYNAMIC RANGE and then either AUTO, DR100%, DR200%, or DR400%.



Fig. 30: These examples show the same shot with DR100% (left) and DR400% (right). At DR100%, the dark llama (our main subject) is correctly exposed, but the much brighter colors in the background are almost completely blown because they were outside of the camera's dynamic range. In the DR400% version of the shot, the exposure (brightness) of the llama didn't change. However, the bright background is now perfectly colored and textured.

Extending the dynamic range for RAW shooters

TIP 44

RAW shooters typically set the camera to DR100% and perform the tone-mapping of their shots later during RAW processing. DR100% provides a realistic live view and live histogram (WYSIWYG).

The typical strategy of a RAW shooter is to expose toward the highlights of a high-contrast scene, making sure that there's sufficient color texture in the bright parts of the shot. This can result in an image with dark midtones and blocked shadows. However, while blown highlights are hard to restore, blocked shadows can be lifted (pushed) later. Getting balanced results from scenes with a very high dynamic range can be done in almost any external RAW conversion software.

Here's what to do:

- Use the live view and live histogram to adjust the exposure in a way that ensures that the important highlights of your scene don't blow. This will preserve the highlights,

but it may also lead to darkened midtones and blocked shadows that you have to deal with later during the RAW conversion of your shot.

- Enhance darkened shadows and midtones by selectively lifting their exposure in your RAW conversion software. For example, you could first lift the overall exposure and then restore the highlights with a highlight-recovery slider, or you could only lift the shadow tones with a shadow-tone slider. You can also combine both methods; many RAW converters are quite flexible and offer several sliders to selectively change the exposure. Lightroom and Adobe Camera RAW (ACR), for example, feature five different controls (exposure, whites, blacks, shadows, and highlights) to perform this task. Whenever you change an exposure slider, you are effectively changing the ISO of any part of the image that is affected by this slider. However, in the digital domain of the RAW conversion stage, nothing is lost and everything is fully reversible. *Selectively* changing the exposure of an image is known as tone-mapping.



Fig. 31: This example shows an image that has been **exposed to the highlights**. The sky is perfectly exposed, but this means that the buildings are literally left in the dark. If that's what you want, great! If not, you must apply some tone-mapping to the RAW file.



Fig. 32: This is the same image after some **tone-mapping** in Adobe Lightroom. The dark shadow regions have been lifted, revealing plenty of detail where the previous image only displayed dark patches. This method is also known as applying adaptive ISO, because different parts of the image received a different degree of exposure push. While the shadows were pushed up (ISO increase), the highlights mostly remained as they were.

until the live view and live histogram display the scene without blown highlights.

- Next, turn the exposure compensation dial in the opposite (positive) direction until the shadows and midtones are displayed as bright as you want them to appear in the final image. Here's the important part: when you turn the exposure compensation dial up again, count the number of clicks it takes to reach the target brightness of your scene. One, two, or three clicks mean you should set the camera from DR100% to DR200% for one stop of additional highlight dynamic range. More than three clicks mean you should use DR400%. More than six clicks mean that highlights may be blown even when you set DR400%, so you might want to avoid overcompensating beyond six clicks. As you know, each click of the exposure compensation dial equals $\frac{1}{3}$ EV (or a third of a stop).



Fig. 33: **Night scenes** with bright lights and high contrast can benefit from a fixed DR400% setting in order to preserve color and texture in the highlights.

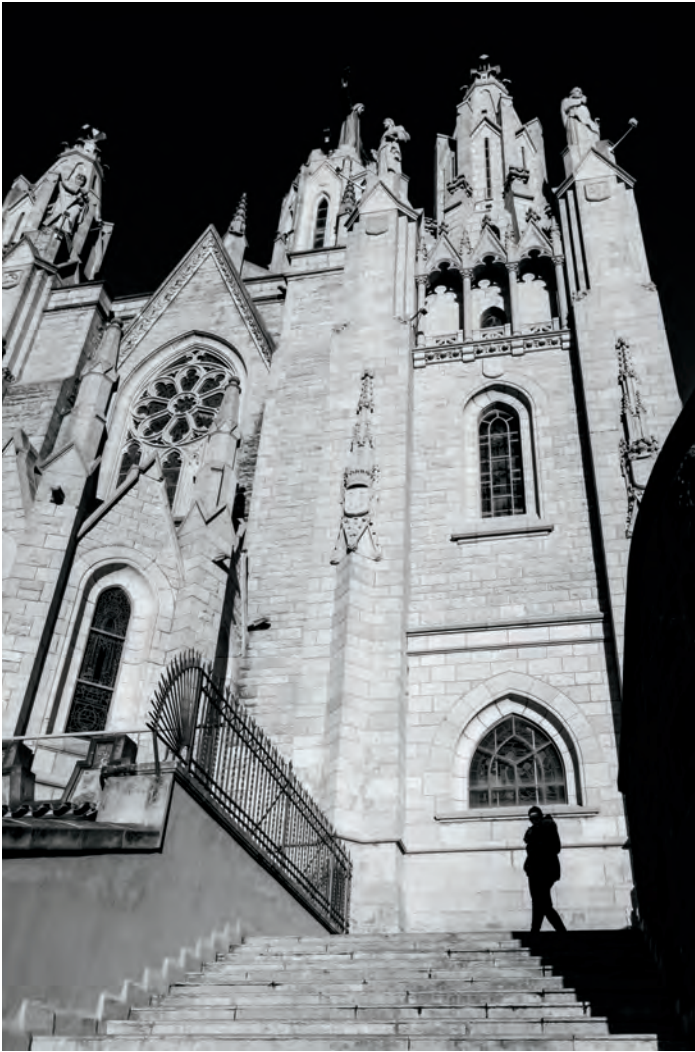


Fig. 34: On the other hand, there are instances where you may want to concentrate on the bright parts and **emphasize the contrast**. In such cases, a fixed DR100% setting is in order when you are exposing to the highlights.

The two above examples illustrate that DR-Auto is not a “smart” setting; it cannot predict what the photographer has in mind. In both cases, DR-Auto would have picked DR200%—definitely not an optimal setting in either case.

Having prepared the camera for HDR, you can now follow these steps to capture the actual images:

- Set the exposure compensation dial to neutral (0) and press the shutter release. Make sure to either use a remote shutter release or the self-timer. The camera will now record the first three shots of the scene, with exposure levels of 0 EV, -1 EV, and +1 EV.
- Set the exposure compensation dial to -3 EV and press the shutter release. The camera is now recording three more images that deviate -4 EV, -3 EV, and -2 EV from the original exposure.
- Finally, set the exposure compensation dial to +3 EV. After releasing the shutter, you'll get three more exposures, this time with +2 EV, +3 EV, and +4 EV.

This procedure results in nine different exposures that you can merge using the HDR software of your choice that will result in an image with an additional dynamic range of ± 4 EV.

Please note that the slowest shutter speed in aperture priority mode is 30 seconds, so your basic exposure (with 0 EV correction) should not be longer than 2 seconds. If you require shots that exceed 30 seconds of exposure time, it's better to use manual mode **M** in concert with the Bulb (B) setting of the shutter speed dial.



Fig. 39: This HDR image consists of three RAW shots that were merged in Adobe Lightroom.

HDR: the handheld way

TIP 49

Thanks to the ISOless sensor in the X100F, you can effectively take handheld HDR shots by combining two (or three) vastly differently exposed RAW files to one HDR-DNG file in Adobe Lightroom or Adobe Camera RAW.

Let's start with how to prepare the camera for this endeavor:

- Set the X100F to aperture priority **A**.
- Select a low ISO setting, such as ISO 200. Don't set ISO 100.
- Make sure the dynamic range is set to DR100%.
- Pre-select a suitable aperture.
- Press the DRIVE button and select AE BKT with a variation of ± 2 in the bracketing menu to activate the camera's auto exposure bracketing.



Fig. 41: The **electronic shutter** is a practical option for shots taken with fast apertures in bright light, when the maximum mechanical shutter speed simply isn't fast enough to avoid overexposure ($f/2$, $1/8000$ s).

TIP 51**The leaf shutter: pros and cons**

Unlike most DSLRs and mirrorless system cameras, which rely on focal plane shutter mechanisms, the X100F employs a leaf shutter that is built into the lens. Leaf shutters are different from focal plane shutters in several ways:

- Leaf shutters reside in the lens, close to the aperture, and they operate almost silently. In fact, the shutter in the X100F is so silent that the camera emits an *artificial* shutter sound which can be switched off with SET UP > SOUND SET-UP > SHUTTER VOLUME > OFF. Leaf-shutter cameras like the X100F are ideal in situations that require silent operation, like shooting on a movie set or in a theater.

- Due to their construction, leaf shutters offer slower maximum shutter speeds than modern focal plane shutters. In the X100F, the maximum shutter speed of the mechanical shutter depends on the set aperture: the wider the aperture, the slower the maximum shutter speed. Between $f/2$ and $f/2.8$, the maximum shutter speed is $\frac{1}{1000}$ s, between $f/3.2$ and $f/3.6$ it's $\frac{1}{1250}$ s, between $f/4$ and $f/6.4$ it's $\frac{1}{2000}$ s, for $f/7.1$ it's $\frac{1}{2500}$ s, and between $f/8$ and $f/16$ it's $\frac{1}{4000}$ s.
- You can manually set “illegal” mechanical shutter speeds beyond the recommended maximum shutter speed in exposure modes **S** and **M**. The cameras will honor these settings and display the shutter speed in red, indicating that there may be issues such as subpar bokeh or exposure inaccuracies. In modes **A** and **P**, the camera will never use mechanical shutter speeds that are faster than the maximum shutter speed for the set aperture. In these modes, the red shutter speed indicates an overexposure warning.
- If your exposure requires a shutter speed beyond the mechanical maximum for the set aperture, you can either use the electronic shutter (set shutter mode ES or MS+ES) or deploy the built-in ND filter. The ND filter will reduce the incoming light by three aperture stops (EV). Example: If your exposure requires $\frac{1}{4000}$ s at $f/2$ and ISO 200, deploying the ND filter will change this requirement to $\frac{1}{500}$ s at $f/2$ and ISO 200—well within the limits of the mechanical leaf shutter.
- Unlike focal plane shutters, leaf shutters can synchronize with flash lights at high speed, without energy-consuming high-speed sync (HSS). Even the tiny built-in flash of your X100F can perfectly synchronize with the leaf shutters at shutter speeds as fast as $\frac{1}{2000}$ s.

era. When you half-press the shutter button, the camera starts focusing on the object covered by the active AF frame and continuously adjusts the distance to the moving object as long as you keep the shutter button half-depressed. In the live view, this may look like the camera is continuously hunting, while the green AF confirmation dot in the bottom-left corner of the screen keeps going on and off. Don't worry! This is normal: the hybrid AF (PDAF and CDAF) has a pretty good track record of getting the moving object in focus when the shutter button is finally fully depressed. Just make sure that the active AF frame or AF zone always covers the part of the image that is supposed to be in focus. Don't forget that PDAF (with its predictive tracking capability) is only available in concert with one of the central AF frames.

- Every camera experiences a small delay between pressing the shutter and recording the image. This shutter lag can be considered by the predictive PDAF: the camera isn't focusing on the object's current position, but on the position the object is *predicted* to be when the image is captured. Please note that predictive autofocus is also possible with CDAF, though to a lesser degree of performance.
- While AF-C focuses using the set working aperture, AF-S can open up the aperture beyond working aperture to improve the AF performance in poor light. This also improves focusing accuracy due to the reduced depth of field caused by the wide-open aperture.

TIP 54

AF modes: Single Point AF vs. Zone AF vs. Wide/Tracking AF

In AF/MF SETTING > AF MODE (or in the Quick menu) you can choose between SINGLE POINT, ZONE, or WIDE/TRACKING autofocus:

- **Single Point AF** mode is my recommended AF setting for most applications. In this mode, you have to manually select one of 91 (or 325) available AF frames. Try to avoid old habits like using only the central frame in concert with the focus and recompose [37] technique. It's better to compose the shot and *then* select a suitable AF frame that covers the part of the image that needs to be in perfect focus. This helps you avoid focus errors that invariably occur when you pan the focus plane in another direction. Such focus errors may be irrelevant with long focal lengths and small aperture openings (large depth of field), but they can be quite unpleasant with wide-angle lenses (like the 23mmF2 in your X100F), a wide aperture opening (small DOF), and situations with a short distance between the camera and the subject. Single Point AF can be used in concert with both AF-S and AF-C.



Fig. 42: Shooting with **minimal depth of field**, you can't afford to use a focus and recompose habit because it would quickly lead to soft results that appear out of focus. Instead, compose the shot, and then focus using a single autofocus frame (there are 91 or 325 to choose from in Single Point AF mode) that covers the part of the image that is supposed to be in focus.

This is why:

- With a large AF frame size, the camera has more to work with and a better chance to find contrast, especially when the light conditions aren't optimal. There's also a higher chance the camera will be able to use the faster PDAF method when one of the central AF frames is active. When PDAF isn't available, the camera will fall back to the slower CDAF.
- With a smaller AF frame size, the autofocus becomes more accurate. A small AF frame gives you better control over what *exactly* the camera is focusing on. Avoid AF frame sizes that are larger than the part of your image that needs to be in focus. For example, if your AF frame is larger than the head of the person you are focusing on, there's a chance that the camera will instead focus on the background behind them, especially if that background contains a lot of contrast.



Fig. 43: To get tiny parts of an image in perfect focus, it's best to choose a **small AF frame size**.

In a similar fashion, you can change the size of AF zones by pressing the focus stick and turning the command dial

left or right. You have a choice of three AF zone sizes: 3×3 (default), 5×5, or 7×7 out of 91 frames.

Since we can regard AF zones as very large AF frames, the same rules apply: larger zones are more convenient, and they potentially offer a faster AF response; but they are also potentially less accurate than smaller zones.

Keep in mind that the faster PDAF method is only available if the zone doesn't extend beyond the central PDAF point matrix. As soon as an AF zone is configured to include at least one CDAF-only AF point, the focus system will switch to CDAF. You can tell the difference between AF points that are PDAF-enabled and those that are CDAF-only because the 49 (or 169) PDAF-enabled points are displayed as larger squares than the surrounding CDAF-only points.

Manual focus and DOF zone focusing

TIP 57

To set the camera to manual focus, move the focus selector at the side of your X100F to the **M** position. There are several manual focus aids available:

- A magnification tool with two magnification levels
- Focus peaking (Focus Peak Highlight) with two strength levels and optional colors (red or blue)
- Digital split image (color or monochrome)
- An electronic distance scale with depth-of-field bars that can be based on two formats: PIXEL BASIS and FILM FORMAT BASIS
- One-Touch-AF (or Instant AF): autofocus in MF with the AE-L/AF-L button

The digital distance scale can help you define a focus zone with pre-determined depth of field (DOF). As long as you opt for PIXEL BASIS in AF/MF SETTING > DEPTH-OF-FIELD SCALE, everything within the DOF zone will look pixel-sharp, even

when the image is magnified to a 100% view. Please don't confuse manual zone focusing with Zone AF—they are completely different.

Here's a zone-focusing example: manually set a distance of 15 feet and stop down to $f/11$. The DOF bars will show a depth-of-field zone that begins at around 12 feet and ends at around 30 feet. This means that everything located in this zone (between 12 and 30 feet) will appear equally in focus in the final image. All you have to do is make sure that your subject is within that zone when you press the shutter button.

A special case of manual zone focusing is setting the hyperfocal distance [38]. This is the distance setting with the maximum DOF (all the way to infinity). Again, the electronic DOF scale can be very helpful: all you have to do is manually set the distance so that the blue DOF bar on the right touches the infinity mark. For example, using the 19mm WCL-X100 wide conversion lens at $f/16$, the hyperfocal distance is at about 16 feet, with the pixel-sharp DOF zone extending from nine feet to infinity.



Fig. 44: Setting the hyperfocal distance with the electronic distance and DOF scale: instead of focusing on a predetermined distance, manually change the focus distance until the blue DOF bar touches the infinity mark on the right end of the scale. This gives us the hyperfocal distance for a given aperture and focal length. This image shows the hyperfocal distance at $f/16$ for both the PIXEL BASIS format (left) and FILM FORMAT BASIS format (right).

Please note that depth of field is very much dependent on the circle of confusion [39] (CoC). Fujifilm uses a very conservative CoC that guarantees pixel-sharp results even when the DOF zone is viewed at 100% magnification on a computer screen. Fuji is literally using the sensor's maximum resolution as a benchmark. In PIXEL BASIS mode, everything that's located within the electronic DOF zone will be rendered at least as sharp as the sensor can resolve it. In the age of pixel peeping, this is as good as it can get.

Manual focus assistants: focus peaking and digital split image

TIP 58

The X100F features two MF assistants:

- **Focus Peaking** (or Focus Peak Highlight) emphasizes the edges of objects when they are in focus.
- **Digital Split Image** tries to simulate the split image indicator of analog SLRs. It works best with vertical lines (or horizontal lines when the camera is held in portrait orientation). It uses the sensor's PDAF-enabled area, which is why the digital split image is just as large as the area covered by the central PDAF frames.

To quickly switch between the two MF assistants, you can press and hold the rear command dial for about a second while you are in MF mode.

Here, you can watch a short video demonstrating the manual focus assistants [40].

Focus check: use the magnifier tool!

TIP 59

The magnifier tool is helpful for checking whether or not the current focus is spot-on. Simply press the rear command dial (either in AF-S/Single Point AF or in MF mode) to magnify everything that is covered by the active focus frame.

- Face detection uses a custom version of weighted multi metering that puts an emphasis on the selected face. The goal is to deliver an exposure with correct skin tones. It may also influence the camera's auto white balance.

Face detection is both a blessing and a curse. It's a blessing when it works because it focuses directly on a face and makes sure that it's correctly exposed. It's a curse when the detection goes wrong, because it doesn't just mean that the focus might miss; it may also mess up your exposure metering.

The good news is that in most cases, face detection works, even with people who only show their profiles to the camera. The bad news is that face detection may not work well on folks wearing glasses.

- I don't recommend using face detection in burst mode because the exposure metering may change during the series of shots, depending on whether or not a face is detected.
- If you want to take face detection exposure metering out of the equation, you can set the camera to manual exposure mode **M**. While metering will still be affected in this mode, the exposure itself will not.
- Face detection works with the full sensor area and only employs CDAF. PDAF and its predictive capabilities aren't available. This means that AF-C tracking of moving objects doesn't work as well as it could. In other words, face detection isn't the best option to use when tracking an athlete or a child running toward the camera. It's better to use the camera's conventional AF-C mode with one of the central AF frames or an appropriate AF zone.
- Spot, center-weighted, and average metering aren't available when face detection is active. The camera is always using a derivate of multi metering.

- When face detection fails to detect a face in the scene, the camera will automatically fall back to the selected AF mode: Single Point, Zone, or Wide/Tracking. At the same time, exposure metering reverts back to regular multi metering.
- AF Lock is not available when face detection is active.
- Face detection can be assigned to one of the X100F's function (Fn) buttons. Personally, I tend to assign it to the lower selector button.



Fig. 45: Face detection is best for stationary scenes with one or more people looking at the camera. For people who are moving toward the camera, use one of the central AF frames or an AF zone in concert with the X100F's tracking autofocus (AF-C).

The X100F has improved face detection accuracy due to an added, optional eye-detection feature. Eye detection is only available in AF-S mode. To activate it, select either FACE ON/LEFT EYE PRIORITY or FACE ON/RIGHT EYE PRIORITY. You can also select FACE ON/EYE AUTO to make the camera focus on the eye that's closest to the camera, or select FACE ON/EYE OFF to deactivate eye detection during face detection.

- Use Single Point AF or Zone AF. Select an AF frame or zone position and size that cover the part of the moving subject you want to be in focus. If possible, use the inner AF frames, which, as you know, are PDAF-enabled. However, it's definitely possible to also use the outer frames that only operate with CDAF. If your composition requires them, go for it!
- Set a suitable exposure and make sure that the shutter speed is fast enough to avoid unwanted motion blur. Most action shots require shutter speeds of at least $\frac{1}{500}$ s.
- Follow the moving subject in the viewfinder, making sure that the selected AF frame or AF zone always covers the part that needs to be in focus. Do *not* half-press the shutter button!
- *Fully* depress the shutter button in one swift motion when you want to take the shot. The camera will need some time to focus, so make sure the AF frame stays positioned over the moving subject while the camera is focusing. As soon as the camera is able to lock focus, it will automatically take the shot. This time between fully depressing the shutter and the camera taking the shot can take a good fraction of a second.

The AF trick, or shutter mash, is based on the camera's autofocus priority logic. When you release the shutter, the camera *first* attempts to lock the focus, *then* take the shot. Since the delay between having locked the focus and releasing the shutter is very short, the moving subject ends up being in focus most of the time. This means that the AF trick works best with aperture settings that offer sufficient depth of field, and with subjects that don't move too fast toward the camera.

A negative aspect of this method is the delay between fully depressing the shutter button and the camera taking the shot. This makes it challenging to hit decisive mo-

ments, and requires some amount of foresight from the photographer.



Fig. 47: A walking horse captured using the **autofocus trick** or shutter mash technique. With older X-mount models like the X100, X100S, X-Pro1, X-E1, X-M1, or X-A1, this method is the only way to capture subjects (using the camera's autofocus) that are moving toward the camera. This sample image was taken with an X100S and the 33mm TCL-X100 conversion lens.



Fig. 49: Isolating a subject by panning can be performed with either manual focus or with AF-C.

TIP 69

Focusing on moving subjects (3): AF-C tracking using Single Point AF, Zone AF, or Wide/Tracking AF

The predictive PDAF of your X100F uses the 49 or 169 (depending on your NUMBER OF FOCUS POINTS setting) central AF points. Predictive PDAF allows you to track moving subjects with your camera in three-dimensional space. Since the camera is able to calculate the movement of the object, it can automatically pre-focus on its future position and compensate for any inherent shutter lag.

The X100F also improves the predictive capabilities of the CDAF. This means that subject tracking is also available with AF frames that surround the central PDAF points, as long as the burst rate in continuous shooting mode doesn't

exceed 5 frames per second. It's important to note that the hit rate of such predictions is never near 100%, but it's accurate enough to deliver good results in concert with the camera's burst mode settings.

Let's start with the **Single Point AF** and **Zone AF** modes:

- Set the focus mode selector switch to AF-C and make sure that high performance mode is on. Also make sure that the shutter type is set to the mechanical shutter (MS) in the shooting menu.
- Set the camera to burst mode (set the DRIVE button menu to CL, CM, CH, or CSH). I recommend using CH or slower, since CSH doesn't display a real-time live view image between shots, and it only supports the inner PDAF frames. If you insist on using CSH, the optical viewfinder (OVF) may be a good option—as you know, it's blackout-free and shows no lag at all.
- If you are using Single Point AF, select one of the central PDAF-enabled autofocus frames. If you use one of the outer AF frames, the camera will only use CDAF.
- If you are using Zone AF, select a zone that doesn't extend beyond the central 7×7 AF point matrix. If you use a zone that includes AF points beyond this PDAF-enabled area, the camera can only use CDAF.
- Position the selected AF frame or AF zone to directly cover the subject or the part of the subject that you want in focus. Half-press the shutter button, and the camera will start tracking the subject covered by the AF frame or AF zone.
- Keep the shutter button half-depressed as you follow the moving subject with the selected AF frame or AF zone.
- Fully depress the shutter when you want to start taking a series of exposures. The actual burst speed (frame rate)



Fig. 52: Two versions of the same shot, processed with **different white balance settings**. The image above shows the WB Auto setting without further corrections; the image below shows the same shot after a manual white balance adjustment in Adobe Lightroom. While white balance can also be adjusted with the camera's built-in RAW converter, extensive changes like this one are easier to accomplish with external RAW conversion software.

Custom white balance: a little effort can go a long way

TIP 71

This useful function is only available *before* you take a shot, because you are metering the white balance of the actual scene. Custom white balance allows you to calibrate the camera's white balance toward a specific object that you want to appear neutral in the final image.

Here we go:

- Select IMAGE QUALITY SETTING > WHITE BALANCE > CUSTOM(1–3) and press the RIGHT SELECTOR KEY (right arrow).
- Point the camera toward a surface that you want to use as a neutral reference, for example a white wall or a gray card [45]. Make sure that the surface is large enough to be fully covered by the white balance metering frame in the viewfinder. Come closer to your subject or zoom in if you need to.
- Fully press the shutter button to meter and set the new custom white balance. The live view will change accordingly and simulate the adjusted color temperature. If you are happy with the result, confirm it by pressing the OK button.

You can use the same procedure with a firing flash unit. In this case, the custom white balance will meter the mix of flash light and surrounding light that hits your neutral reference surface.

Don't worry! You are under no obligation to use the custom white balance later during RAW conversion. It's simply one of many options, and you can always adjust it later as you please. For example, you can use the built-in RAW converter with a manual KELVIN setting or one of seven white balance presets (FINE, SHADE, FLUORESCENT LIGHT 1–3, INCANDESCENT, and UNDERWATER). You can even use



Fig. 54: **WB SHIFT in action:** The example above shows a straight-out-of-camera image (SOOC JPEG) with the AUTO white balance settings. Below, you can see the same image, again straight out of camera and with AUTO white balance, but with an additional WB SHIFT of BLUE +3 and RED -3 to make it look cooler than the original.

Important: *WB Shift is only available for in-camera JPEGs from the built-in RAW converter (SOOC JPEGs). When you process a RAW file externally with Adobe Lightroom or similar software, your WB Shift settings will be disregarded.*

Film simulations: it's all about the look

TIP 74

The importance of film simulations for the overall look of a JPEG is often underestimated. Film simulations influence color grading, color saturation, dynamic range, and contrast in the resulting JPEGs. Picking a film simulation is always my first step when I'm adjusting JPEG parameters. As with all JPEG parameters, film simulations have no effect on the actual RAW file (the digital negative). Instead, they only affect the JPEGs that are generated in the camera (the digital prints). The X100F offers six different color film simulations, eight black-and-white modes, and one sepia option:

- PROVIA is the standard, all-purpose setting of your X100F. The name reminds us of Fuji's popular Provia slide film.
- ASTIA is another color slide film derivative with softer highlights and pleasing skin tones. It's often used for portraits, but can also work with landscape shots that feature a lot of vegetation. A special treat of this film simulation is its bluish shadows.
- VELVIA is a very contrast-heavy, color-saturated derivative of the legendary Fuji Velvia slide film. It's mostly used for landscape and nature shots and is definitely not the best choice for portrait work.
- CLASSIC CHROME reminds us of the golden era of *LIFE* magazine documentary color photography. The distinctive look of Classic Chrome is equally suitable for landscapes and portraits.



Fig. 55: The distinctive look of **CLASSIC CHROME** has earned it much popularity in a very short time.

- **PRO NEG. HI** is derived from a negative film that was specifically made for portraits. It delivers accurate and pleasing skin tones with nice contrast, adding some punch to the image.
- **PRO NEG. STD** is the most neutral film simulation of the X100F. Featuring flat contrast, subdued colors, and high dynamic range, it can look dull at first, but the JPEGs are usable for further post-processing. Fuji recommends this film simulation for studio portraits in a flash setup.



Fig. 56: **Antagonists:** PRO NEG. STD and VELVIA illustrate the spectrum of Fuji's different film simulation modes. On the left you can see the PRO NEG. STD version of a shot, and on the right, its VELVIA cousin.

- **MONOCHROME** is Fuji's standard black-and-white conversion. Black-and-white photography depends on different gray levels being assigned to different colors. In order to increase the contrast, many photographers combine **MONOCHROME** with increased **SHADOW TONE** and **HIGHLIGHT TONE** settings. Additionally, they decrease noise reduction to reveal more detail and display more noise, which gives the appearance of film grain.
- **MONOCHROME+Ye FILTER** adds a digital yellow filter to the black-and-white conversion. This typically results in a slight increase of contrast because yellow parts of the color images will be represented by brighter gray tones.
- **MONOCHROME+R FILTER** adds a red filter to the black-and-white conversion. This means that skin tones will become brighter, which will camouflage reddish skin impurities. Conversely, blue skies will be darkened, adding contrast between clouds and the sky.
- **MONOCHROME+G FILTER** adds a green filter to the black-and-white conversion. This filter will add texture to skin tones and can potentially emphasize impurities.
- **SEPIA** results in a sepia-toned monochrome JPEG for an antique touch.



Fig. 63: The **built-in RAW converter** in action: The left image shows the scene as it was recorded with the camera's default settings. On the right, you can see the same shot processed with ACROS+Red Filter and maximum contrast (SHADOW TONE +4 and HIGHLIGHT TONE +4).

Note: In concert with firmware 2.00 for the X100F, Fujifilm has announced Windows and macOS based versions of X RAW STUDIO [53]. This software connects via USB to your X100F and allows you to comfortably control the camera's built-in RAW converter from your Mac or PC.

TIP 82 Comparing RAW converters

So far, we have talked a lot about the X100F's built-in RAW converter. It's the perfect tool to create JPEGs. It's a JPEG shooter's paradise! It's also super-easy, because the built-in RAW converter utilizes the same functions and parameters available in the shooting menu. That's no surprise,

because the built-in RAW converter *is* the JPEG engine of the camera! If you are a JPEG shooter, ignoring the internal converter that turns RAW files to in-camera JPEGs means overlooking the aspects of the camera that make the X100F so special. That's why even diehard JPEG fans should shoot with FINE+RAW. You need the RAW files to feed the engine that generates JPEGs with the colors, tonality, and overall look that you like from your Fuji camera.

What about the other half—diehard RAW shooters who don't care much about JPEGs, Fuji colors, or in-camera conversion? Those guys (I tend to be one of them from time to time) require an external RAW converter to process the RAW files on a computer. The results are often saved as uncompressed 16-bit TIFF files of more than 100MB each. Such files can be further processed in Photoshop and similar applications.

In this tip, I'll compare how certain popular external RAW processors handle specific features of the X100F:

- **RAW File Converter EX** came free with your camera. This software is based on an older version of the Japanese Silkipix [54] RAW processor that is currently available in version 8. If you want to use all the features of this software, you should upgrade to the latest version of Silkipix. As a Fujifilm camera user, you are eligible for an upgrade discount in many territories. Please note that the current RAW File Converter EX *version 2* also supports Fujifilm's film simulation modes. This software is available as a free download [55].
- The most popular RAW converter is **Adobe Lightroom** [56]. Its processing module is also available in Photoshop as **Adobe Camera Raw**. Please note that in October 2017, Lightroom's name was changed to *Lightroom Classic CC*. In the context of this book, "Adobe Lightroom" refers to "Lightroom 6" or "Lightroom Classic CC." It does *not* refer to the new "Lightroom CC," which is geared toward cloud

correction profile for the X100F lens *on top* of the meta-data-based digital lens corrections. With the additional profile, distortion and vignetting can be further corrected or even over-corrected.

- **Capture One Pro** can also process lens-correction meta-data. Unlike Lightroom and Silkipix, it allows the user to control the intensity of the corrections or switch them off altogether.
- **Iridient Developer** can use lens-correction metadata, too. Like Capture One, it also provides control over the extent of the corrections. In a similar fashion, **Iridient X-Transformer** offers checkboxes to switch off any of the three metadata-based lens correction parameters. This means that Iridient X-Transformer, when used as a Lightroom plug-in, can serve as a way around Lightroom's current inability to disregard RAW metadata-based lens corrections.
- **Photo Ninja** ignores all lens-correction metadata. Instead, the software asks the user to provide suitable profiles or to manually correct distortion, vignetting, and CAs.

Automatic lens metadata corrections can look a bit different depending on the RAW converter because each converter tends to interpret the data differently.

TIP 83 Displaying EXIF metadata

Digital cameras save information about every recorded image in the EXIF [44] data of each RAW or JPEG file. This data can be useful to RAW converters and cataloging software, but it can also be useful to you to help you understand how an image was exposed.

EXIF data consists of information about exposure parameters, camera settings, date and time, focal length, AF settings, white balance, JPEG parameters, DR mode, digital lens

correction data, serial numbers of cameras and lenses, etc. Many of these data points are saved in an area called “maker notes,” which contains information on camera features that are specific to a certain brand (like Fujifilm). ExifTool can read the EXIF data and is also able to make sense of maker notes. ExifTool is rarely stand-alone. Instead, you can get it as part of other image utilities, such as ExifTool GUI for Windows or GraphicConverter for Mac OS users.

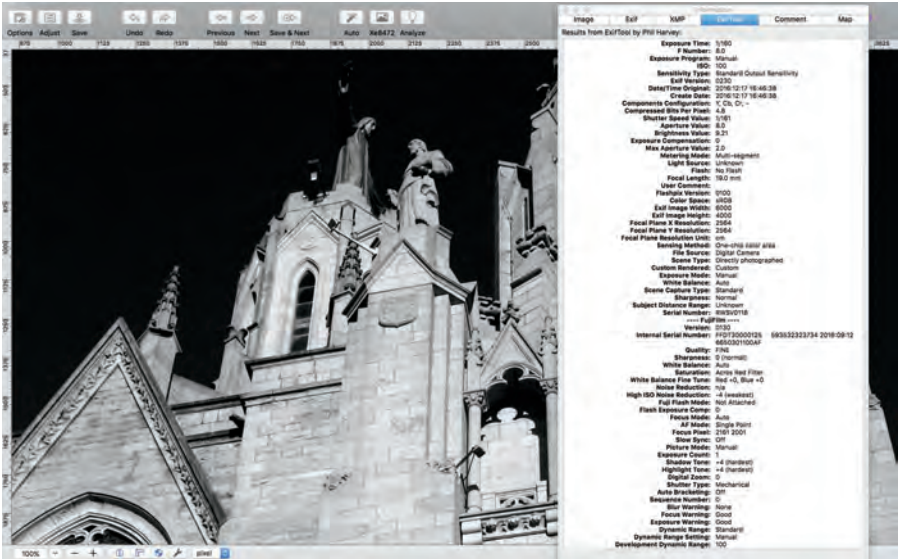


Fig. 64: EXIF data of an X100F shot in GraphicConverter: There’s a vast amount of information about every image, including brand-specific Fujifilm maker notes.



Fig. 65: A large motion panorama: The camera automatically takes as many frames as it needs to stitch the panoramic JPEG image.

Here are a few tips for getting the best results with motion panoramas:

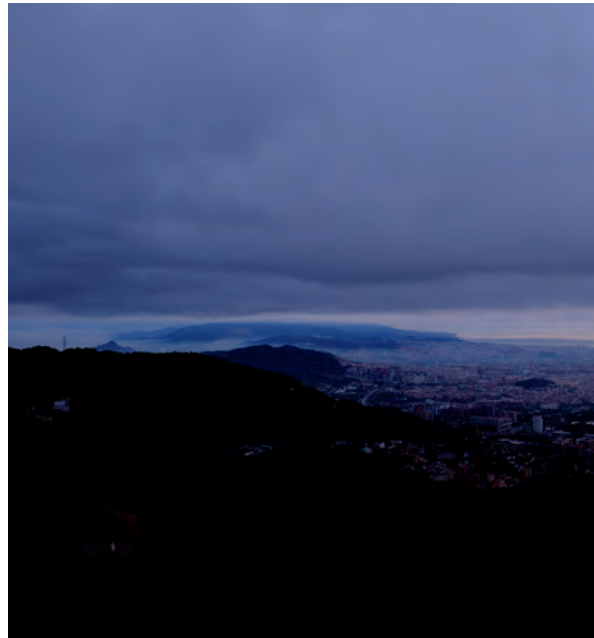
- Since MOTION PANORAMA results in only a JPEG file (no RAW), JPEG parameters such as white balance and film simulation must be set *before* taking the shots.
- White balance and focusing remain constant during the recording of a motion panorama. This applies to all focus modes (AF-S, AF-C, and MF). That's why it's important to set a focus distance and depth of field that work for the entire panoramic scene.
- Panoramas tend to extend over a wide area with varying light conditions and strong changes in contrast. In such cases, it's smart to shoot with an extended DR setting, such as DR200% or DR400%. In addition to that, the exposure should be set in a way that suits the entire panoramic image, not just a small part of it. The edges of a panorama are rarely representative; it's usually better to base your exposure on the main part of the image in the middle. Motion panorama works with all four expo-

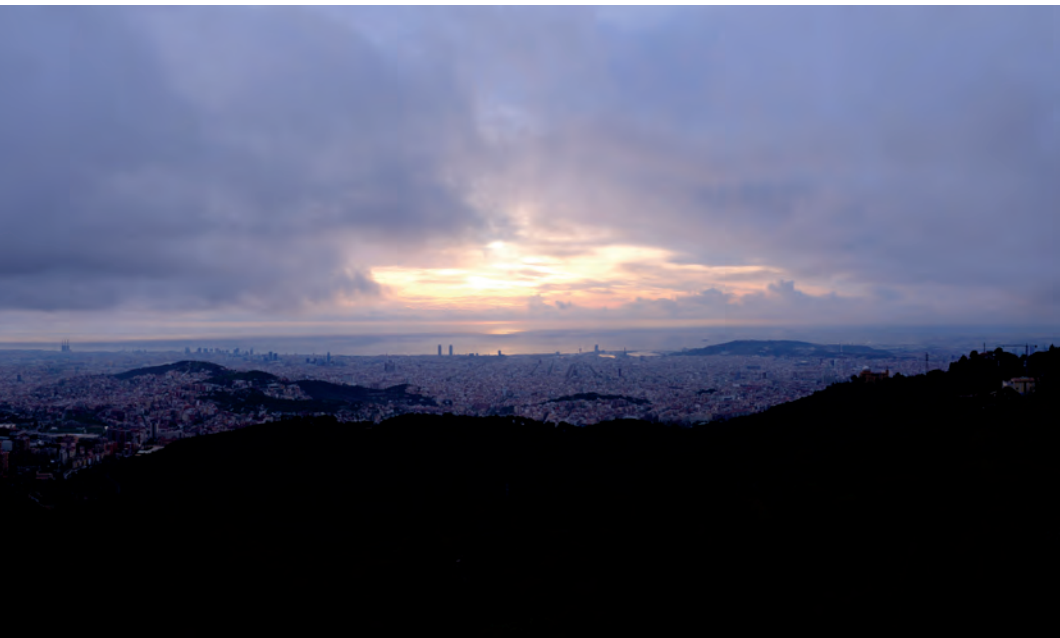


sure modes, so shooting in manual mode **M** may be the smartest option. Please note that motion panorama only works with multi metering.

- If you decide to *not* manually set exposure, white balance, and focus, point the camera towards a representative part of the panoramic scene, then lock focus, exposure, white balance, and DR by half-pressing the shutter button. Then pan to the point where you'd like to start the panning action (while holding the shutter button half-depressed), press the shutter button fully, and start panning.
- Avoid scenes that contain a lot of motion. Moving objects (people, vehicles, etc.) can lead to ghosting artifacts, which is when moving objects (partially) appear in more than one spot of the final panorama.
- Keep a healthy distance to the panoramic scene. Don't shoot panoramas in close quarters. Also make sure that you have sufficient depth of field. Wide-angle lenses are better suited for this job than normal or telephoto lenses.

Fig. 66: A more rewarding way to shoot a panorama is taking individual overlapping images and merging the RAW files into a **Panorama-DNG** using Adobe Lightroom. Not only is the resolution of the resulting image much higher—by processing a DNG file, you can also take advantage of the ISOless sensor and its full dynamic range. The image above shows the Panorama-DNG after processing in Lightroom; the image below displays the same shot as it would look as a straight-out-of-camera motion panorama.





scene that's already fully exposed by natural light, the camera's TTL flash metering would conclude that no additional light is necessary. The forced flash would still fire, of course, but with minimal output; it would probably be almost invisible in the resulting shot. To emphasize the flash-light component, reduce the exposure of the surrounding-light component.



Fig. 68: Reducing the surrounding-light component to darken the background leaves more room for the flash-light component.

Here's how it works:

- You can control the exposure of the surrounding-light component either with the exposure compensation dial or by setting an appropriate manual exposure (ISO, aperture, shutter speed). Less surrounding light will prompt the TTL flash metering to add a stronger flash-light component, since the TTL flash system will always try to deliver balanced results. Changing the exposure compen-

sation dial has no effect on the flash component of the shot; it only affects the exposure of the surrounding-light component.

- To control the surrounding-light component in manual mode **M** using the live view and the live histogram, make sure to set SET UP > SCREEN SET-UP > PREVIEW EXP./WB IN MANUAL MODE > PREVIEW EXP./WB.
- In a studio, you often want to minimize the surrounding-light component and illuminate your subject entirely with flash light. In such cases, I recommend small aperture settings (large aperture numbers), base ISO 200, and a fast shutter speed. The fastest official flash synchronization speed of the X100F is $\frac{1}{2000}$ s, but some flash units won't be that fast, especially when fired at full power and/or with a wireless transmitter. To compose a scene with very little surrounding light in mode **M**, set SET UP > SCREEN SET-UP > PREVIEW EXP./WB IN MANUAL MODE > OFF. Otherwise, it will be hard to see anything in the viewfinder other than darkness.
- Sometimes the fastest available flash sync speed ($\frac{1}{2000}$ s) will still overexpose the surrounding-light component, even at base ISO 200. Yes, you could stop down the aperture, but this might negate the purpose of achieving a nice subject-to-background separation with little depth of field. In such a case, it's useful to deploy the camera's built-in neutral density filter to reduce the amount of light that hits the sensor by three stops.
- Like the DR function, flash light is often used to reduce contrast between a dark subject and a bright background. You can combine both features, which may be useful if the background—when viewed isolated from the foreground—still contains so much contrast that DR expansion is required. Think of a night scene with city lights, street lamps, and bright billboards in the back-

more power, so you may need a stronger flash. It's also worth noting that bouncing the flash from a colored surface will tint the light accordingly.

- To add a tint or change the color temperature of your flash light, you can attach colored gel filters in front of your reflector. The color temperature of unfiltered flash light usually corresponds to regular daylight.
- The range of your flash unit depends on the set aperture, the ISO setting, and (of course) the power setting. In TTL mode, the camera is automatically adjusting the light output of your flash, but many flash units (including the built-in flash of the X100F) can also be set to manual. This way, you are the one setting the power output of the flash. In manual mode **M**, changing the shutter speed doesn't affect the brightness of the flash-light component of your shot. Hence, changing the shutter speed is a quick way to adjust the exposure of the surrounding-light component without messing with your carefully balanced manual flash-light setup.

TIP 91

Rear-curtain flash synchronization: what's the deal?

Flash photographs are double exposures consisting of surrounding light and flash light. When you shoot the surrounding light with a slow shutter speed, there is the question of when the flash (with its much faster speed) should fire. Normally, the flash is fired along with the shutter opening at the *beginning* of an exposure. However, selecting the rear curtain makes the flash fire at the *end* of the exposure when the shutter closes.

Naturally, moving objects change their position during the exposure of a shot. Synchronizing the flash with the rear curtain ensures that moving objects are frozen where they are at the end of the exposure as opposed to the beginning. This often results in the moving object appearing more natural in the image.



Fig. 70: **Front- vs. rear-curtain sync:** This example shows the same scene photographed with front-curtain sync (above) and rear-curtain sync (below). The shot above shows how the flash freezes the moving vehicle at the beginning of the exposure while the rest of the shot below shows it being frozen at the end of the exposure. The rear-curtain version looks more natural and avoids the false impression of the car moving backward. This is also a good example to examine flash photographs as double exposures. You can see how the slow shutter speed captures the moving vehicle as a blurry trail of light, while the fast flash instantly freezes parts of it.

Flash synchronization: where's the limit?

TIP 92

Officially, the fastest flash sync [62] speed of the X100F is $\frac{1}{20000}$ s.

- In exposure modes **P** and **A**, the camera will never offer a shutter speed faster than $\frac{1}{20000}$ s. If this is too slow for the current light conditions, the surrounding-light component will be overexposed. In this case, the shutter speed of $\frac{1}{20000}$ s will be displayed in red. To avoid overex-

posure, stop down the lens, reduce ISO (but never below 200), or use the built-in neutral density (ND) filter [30].

- In exposure modes **S** and **M**, you can select shutter speeds that are even faster than $\frac{1}{2000}$ s: up to $\frac{1}{4000}$ s. The X100F will honor these settings in flash mode, but there may be a price to pay: the resulting images can display some partial shadowing of the flash. Its power setting plays a role, as well. At maximum power, many flash units need between $\frac{1}{200}$ s and $\frac{1}{500}$ s to fully emit their energy. This means that with very fast shutter speed settings, a portion of the flash light wouldn't be recorded: the shutter would already have closed before the flash had finished.



Fig. 71: It's also possible to deliberately use very **slow sync** speeds to create a blurry background behind a more contoured flash-lit foreground.

- Using wireless flash (TTL and manual) can impose further sync limits, because the transmitter on the camera has to communicate with the off-camera flash. This latency takes time and can reduce the maximum effective sync speed of your setup. In my experience, light-based communication (such as Fujifilm EF-X500, Metz M400)

results in less latency than radio-based communication (like the Godox 2.4GHz system).

- With firmware 2.00, Fujifilm has promised improvements for radio-based off-camera flashes. If and how this improves latency issues remains to be seen. As of now, I recommend $\frac{1}{5000}$ s as a safe maximum sync speed for off-camera radio flash units operating at or near full power. With less output power, faster shutter speeds of up to $\frac{1}{10000}$ s may also be possible.



Fig. 72: This wireless flash shot was taken with a shutter speed of $\frac{1}{800}$ s using a Godox X1TF radio transmitter and TT600 flash.

Red-eye removal: a two-step affair

TIP 93

If the flash and your lens share (almost) the same optical axis, this can lead to the red-eye effect [63]: an unpleasant red reflection in the eyes of humans or animals.

- If you pull up FLASH SETTING > RED EYE REMOVAL and then select either FLASH or FLASH+REMOVAL, the camera



Fig. 79: **Camera Remote** offers a simple interface to control your camera with a smartphone or tablet. To autofocus, double-tap on a specific part of the WYSIWYG live view and wait for the green confirmation rectangle to appear. Sadly, there is no live histogram, and you can't magnify the live view. There is a rudimentary shooting menu, a virtual shutter button, and a playback button that allows you to review images and transfer JPEGs to your mobile device.

Here are a few things you might want to know about Camera Remote:

- Fuji's Camera Remote app allows you to adjust exposure parameters (aperture, shutter speed, ISO, exposure compensation), but you can't remotely change the camera's exposure mode. This means that you must manually set the camera to either **P**, **A**, **S**, or **M** mode *before* you select WIRELESS COMMUNICATION in the camera menu. To change the exposure mode during remote shooting, you must first disconnect Camera Remote, make the desired changes in the camera, and then start over with a new connection.
- There's no electronic level indicator and no live histogram in the Camera Remote live view on your mobile device.

- You can change several shooting parameters from within the Camera Remote app (ISO, film simulation, white balance preset, macro, flash mode, self-timer), but other parameters (such as dynamic range or Auto-ISO minimum shutter speed) must be preset in the camera before entering wireless communication mode.
- There is no bulb functionality in Camera Remote, so your maximum exposure time is limited to the extent of the T setting. If you need more, better use a conventional (tethered or wireless) remote shutter release.
- The X100F also allows you to shoot video with Camera Remote.

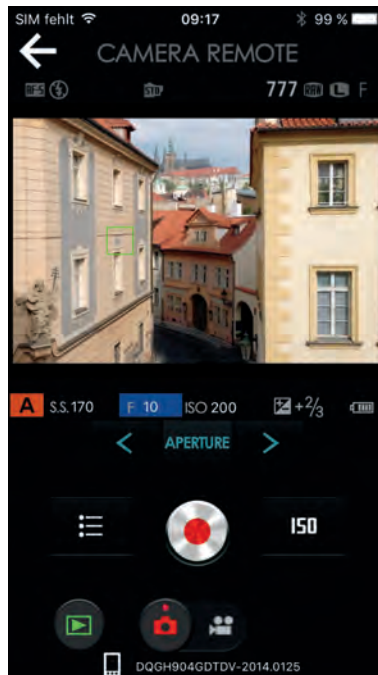


Fig. 80: Changing exposure parameters affects the WYSIWYG live view. The live view in **Camera Remote** always reflects the currently selected film simulation and JPEG parameters. Like in the X100F itself, there is a preview of manually selected DR settings (DR200%, DR400%).

2.9 ANYTHING ELSE?

Hopefully, this book answered many of your questions that went beyond the manual of your camera. However, this isn't the end: you can read my X-Pert Corner blog, participate in Fuji X forums, or join one of my Fuji X Secrets workshops.

TIP 101

Forums, blogs, and workshops: be a part of it!

- High-resolution versions of selected images in this book are available in a Flickr album [32].
- At Fuji X Secrets [71], you will find articles and updates for this book that cover new firmware features.
- My free X-Pert Corner blog [72] covers a variety of topics about the Fujifilm X series. You will find everything from service articles that go beyond this book to First Look previews of new cameras and lenses.
- There are several online forums that focus on Fujifilm's X series: The Original Fuji X Forum [73]; The Ultimate Fuji X Forum [74]; the Fuji X-Series Forum [75]; and FujiXSpot [76]. The latter forum contains a special section where I'm personally available to answer questions or discuss Fuji X-related issues. Please use this forum to contact me with questions or comments.
- Books, blogs, and forums are great, but what about a more personal touch? My site, Fuji X Secrets [77], offers a series of advanced workshops for Fuji X-series users. My workshops cover topics that are similar to those in this book, but on a more in-depth and comprehensive level, including practical demonstrations and plenty of sample images. We work in small groups, and our delegates set the agenda. It's everything you always wanted to know about X, but were afraid to ask.

ONLINE REFERENCES

Websites are not run by Rocky Nook, and are subject to change without our knowledge.

If necessary, we will update these references. For an updated version of this reference list, please download the available document at:

<http://www.rockynook.com/fujifilm-x100f-online-references/>

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