Chapter 1
Getting Started With Your Fujifilm X100T

CONTENTS

• The Fujifilm X100T• Jump Start • Good Things to Know • Using the Monitor and Viewfinder • Using Dials and Buttons • Using Menus • Using the Q Button and Quick Menu •Using The Function Buttons • Managing Images in Playback Mode • How an Image is Captured • Selecting Image Aspect Ratio & Size • Selecting Image Quality

Serious digital cameras give you creative control over your images. However, the best cameras, such as the Fujifilm X100T, give you more control and more settings you can change. Because of the number of controls it offers, your camera may initially seem complicated, but that's not at all the case. All you have to do to get good pictures is to follow the steps in Topic 1–2. When capturing or sharing images you can use the camera's integrated Wi-Fi to display them on an tablet or smartphone or post them on a web site.

In this chapter we discuss just about everything you need to know to take good pictures. We start by exploring how you use the camera set to its fully automatic mode and then see how you use buttons, dials, and menus to change settings and manage your images. Finally we'll take a close-up look at how your camera captures digital images made up of small pixels, and what determines the size and quality of your photos. The foundation you lay by mastering this chapter will make it easy for you to use all of the concepts and procedures discussed in the chapters that follow.

Topic 1–1. The Fujifilm X100T—An Overview

The X100T comes in silver or black.

If there is a camera to wax lyrical about it's the hugely successful Leica that was the camera of choice for generations of photojournalists, fine art and other photographers. Leica has faltered in the digital era and the baton has been passed to Fujifilm and their retro-designed X series of premium compact cameras—especially the latest incarnation in the X100T.

The X100T is an easy-to-carry compact camera with a fast 23mm F2 fixed lens—equivalent to a 35mm lens on a full-frame camera. It is packaged in a highly durable die-cast magnesium body. It captures your images with a 16 megapixel CMOS image sensor that along with its EXR software captures sharp and almost noise-free images at ISO 6400. The camera can be customized using 7 function buttons and 7 setting banks. Here are some things you should know about the camera.

TIPS

- If any of the commands in this book don't work as described, it may be because you have changed a setting that causes a conflict. Reset the camera to its default settings and try again.
- To learn more about the camera's image sensor search the Internet for APS-C X-Trans CMOS II.
- The X100T box contains a silver or black camera, a lens cap, a BC-65N battery charger, an N-95 rechargeable battery, a USB cable, a shoulder strap, two metal strap clips and a clip attaching tool. There is also a owners manual in English and Spanish and product registration information.

• **The Hybrid Viewfinder** with Electronic Rangefinder allows focusing as if using a mechanical rangefinder. There are also a number of manual focusing aides to wean you away from autofocusing on every scene. They include Focus Peak Highlight, Digital Split Image, and a magnified focus area. The camera also uses parallax correction for more accurate image composition when taking close-ups.

• **The 3" LCD monitor** has 1.04 megapixels and both it and the electronic viewfinder display scenes with the same brightness the captured image will have. This is extremely helpful in dim or even dark scenes.

• **A silent electronic shutter** can be set up to 1/32000 second so it's possible to freeze fast motion and use large apertures in bright sun. This makes it possible to capture photos with a shallow depth of field on snowy fields or bright beaches. The shutter's silence also makes it useful when photographing weddings or other public events where being obvious is something you don't want to be.

• **The camera can capture RAW images** that provide the ultimate in image quality.

• **The camera captures full HD (1080p) video** at 60, 50, 30, 25 and 24 frames per second and you can use either the viewfinder or LCD monitor to compose the scene while shooting. Movies can be captured with stereo sound and the camera let's you use slow motion playback and in-camera editing that deletes unwanted frames from the beginning or end of a movie.

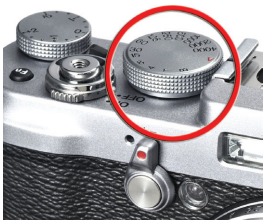
• **The aspect ratio** can be set to the same as a classic 35mm camera (3:2), the format used by medium format cameras and Instagram (1:1) or the one used by HDTV (16:9).

• **Wi-Fi** is integrated into the camera, so you can use the free Fujifilm Camera Remote app to make your smartphone or tablet as a wireless remote control. Pictures and videos on the camera can be browsed, selected, shared and imported using your phone or tablet without the hassle of inputting an ID or password. It is also possible to add location information acquired by the smartphone or other device to the image.

• **Intelligent Face Detection** can be turned on so the camera automatically detects and sets focus and exposure for a face anywhere in the frame.

Topic 1–2. Jump Start—Taking Photos in Program Mode

The aperture ring on the lens.



The shutter speed dial.

The focus mode selector.

TIPS

- To use face detection you have to first turn it ON—it is OFF by default. To do so display the Shooting 1 menu tab, select AUTOFOCUS SETTING then FACE DETECTION and set it to ON.

The camera's Program shooting mode can evaluate a scene and automatically select the best settings to capture it. This mode is great when you want to concentrate on the subject and not on the camera.

Step 1. Getting ready. Insert a formatted memory card and a fully charged battery in the camera then remove the lens cap.

Step 2. Turn on the camera by pressing the ON/OFF switch circling the shutter button.

Step 3. Select the shooting mode by turning the aperture ring on the lens and the shutter speed dial to the red A (auto).

Step 4. Frame the image using the monitor or viewfinder. To switch between them press the VIEW MODE button on the back of the camera.

Step 5. Autoexposure automatically measures the light and sets both the shutter and aperture for a good exposure. The camera displays the scene on the monitor and in the viewfinder with the same brightness it will have when captured.

Step 6. Focus. Set the focus mode selector switch on the left side of the camera to AF-S (Autofocus–single) Place the area of the scene you want sharpest in the center of the screen covered by the small square—called the focus frame. Press the shutter button halfway down to set focus and the camera beeps and the small square turns green to indicate focus is locked. Without releasing the shutter button recompose the scene the way you want it.

Step 7. Take the picture. Press the shutter button all the way down to take a picture and the shutter sounds and the indicator on the back of the camera flashes orange and green as the image is saved to the memory card.

Step 8. Autoflash. In dim light, or when a subject is backlit, the flash fires when you take the picture. If the image is too dark be sure you are close enough. The flash range at ISO 1600 is about 1.6 to 29.5 feet. (50 cm–9 m).

Step 9. Playback the picture. Press the playback button to display the photo you just took. If the results are not what you expected, press the shutter button halfway down to return to shooting mode and try again.

In its default mode the camera focuses on whatever part of the scene is covered by the small white square in the center of the screen. The screen turns green and the camera beeps when you press the shutter button halfway down and the camera achieves focus. If it is having problems focusing there are ways to tell (Topic 3–7).

Topic 1–3. Good Things to Know

The camera uses Secure Digital (SD) cards to store images. The white switch on the left, when slid down, write-protects your image files.

When you first start taking photos, it sometimes seems as if there is too much to learn. Here are some things you may want to know to get you started.

• **The first time you use the camera**, enter the date and time. This information is important in image management.

• **To check the camera's firmware version** hold down the DISP/BACK button as you turn on the camera. To see what version is currently available, or to install it, see http://www.fujifilm.com/support/digital_cameras/software/firmware/x/x100t/.

• **Hey mister, your lens cap is on**! Yes, when using the optical viewfinder you can't tell by looking through it that the lens cap is on.

• **You can tell how many times the shutter has been used** by selecting SHUTTER COUNT on the Set-up 2 menu tab.

• **To charge a battery** use the included battery charger which will fully charge a dead battery in about 3 hours. In cold weather, the battery discharges more rapidly so you'll capture fewer photos and have less playback time. To be cautious you should carry a fully charged spare battery in all weather.

• **To insert a battery or memory card**, open the battery chamber cover on the bottom of the camera. When finished, close the cover and slide it until it clicks into place.

  • **To insert a battery** (NP-95), hold it terminals down with its front label toward the front of the camera. Use it to push aside the orange battery lock and press it down until it locks. (The battery can go in four ways but only works in one—align the three contacts on the battery so they will connect with the three at the bottom of the battery compartment). To remove the battery, press the orange battery lock aside so the battery pops up. Remove the battery when not using the camera for extended periods. There is a slight but continuous drain even when the camera is turned off.

  • **To insert a memory card**, orient it so its front label faces the front of the camera and press it, terminals down, into the slot next to the battery` until it clicks into place. To remove the card, press and release it so it pops up so you can grip it and pull it out. To format a new card, select FORMAT on the Set-up 3 menu tab. The camera accepts SD, SDHC and SDXC (UHS-I) memory cards and has approximately 55 Megabytes of internal memory.

• **The indicator lamp on the back of the camera** indicates the camera's status as follows:

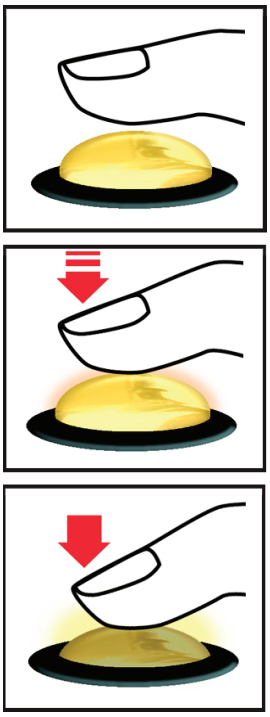
Color	Meaning
Glows green	Focus locked.
Blinks green	Blur, focus or exposure warning. Pictures can be taken.
Blinks green and orange	Recording pictures. Pictures can still be taken.
Glows orange	Recording pictures. No additional pictures can be taken at this time
Blinks orange	Flash charging; flash will not fire when picture is taken.
Blinks red	Lens or memory error.

TIPS

• Information on attaching the shoulder strap, charging and inserting batteries, and choosing and using memory cards are covered in the first few pages of the printed *Owner's Manual* that accompanies your camera.

• You can make the camera silent using the SILENT MODE setting on the Set-up 1 menu tab.

• The camera has to be awake before buttons such as Q, Playback, VIEW MODE or DRIVE will work. Press the shutter button down and release it to wake up the camera.



Pressing the shutter button halfway down locks exposure and pressing it all the way down takes the picture.

• **Use the optical viewfinder to take images** because the electronic viewfinder and LCD monitor consume more power.

• **The diopter adjustment dial** to the left of the viewfinder adjusts the viewfinder image so you may not need glasses when taking pictures.

• **If you can't see the scene or settings** displayed in the viewfinder or LCD monitor press the VIEW MODE or DISP/BACK buttons until you can.

• **To switch between the optical and electronic viewfinder** press the View mode selector lever on the front of the camera to your right.

• **If you have trouble autofocusing**, you can move the AF Frame, use focus lock or use manual focus.

• **As you take photos**, they are first stored in the camera's internal memory (a buffer) and then moved to the memory card. You can take pictures one after another until the buffer is full.

• **The camera's sounds** can be turned off, by turning SILENT MODE on the Set-up 2 menu tab to ON.

• **The shutter button has two stages.** When you press it halfway down, the camera sets exposure and focus and displays the selected aperture and shutter speed on the screen.

• **The camera's autorotate sensor** senses when you turn the camera vertically so images shot in that position (portrait mode) are rotated during playback so they can be viewed without rotating the camera or everyone tilting their head when viewing them on a connected TV.

• **The POWER MANAGEMENT settings** on the Set-up 2 menu tab are set to turn the camera off after 2 minutes of inactivity but you can set this to 5 minutes or turn it off so the camera stays on until you turn it off manually with the ON/OFF switch. You can also turn on or off OVF POWER SAVE MODE and HIGH PERFORMANCE.

  • OVF POWER SAVE MODE, when ON reduces power consumption except when you use the electronic viewfinder or electronic range finder. The slowest shutter speed available when this is ON is ¼ second.

  • HIGH PERFORMANCE, when ON, allows the camera to wake up from sleep mode faster so you don't miss a shot.

• **To wake the camera up** when power save is in effect, press the shutter button halfway down and then release it.

• **Pressing the Playback button** turns playback mode on and off. When on you can scroll through and manage the images you have captured. To return to shooting mode press the shutter button halfway down.

• **A battery icon** indicates when the battery should be recharged or replaced.

A battery icon on the monitor indicates the status of the battery's charge. When it blinks, it's time to recharge.

• **To avoid missing action shots**, compose the image and press the shutter button halfway down to focus the camera. Continue to hold it down as the action unfolds and press it all the way down to take the photo instantly. Setting the focus mode selector to AF-C (continuous) will track a moving subject and keep it in focus (Topic 3–7).

• **If the camera can't focus** you may be too close.

• **If flash photos are too dark**, you are probably too far from the subject. The built-in flash has a range at ISO 1600 of approximately 1.6–29.5 feet (50

Fujifilm makes two lenses that change the lens focal length—the TCL-X100 is a 1.4x 50mm Equivalent lens and the WCL-X100 is a 0.8x 28mm Equivalent lens.

cm– 9 m) To illuminate subjects farther away you need an external flash or a higher ISO setting.

• **If flash photos are too light**, you may want to use flash compensation or use the built-in neutral density filter.

• **If your pictures are blurred**, the shutter speed may be too low or you may not be holding the camera steady as you smoothly press the shutter button. Most blurry photos are caused by jabbing the shutter button. If the same area is blurred in a number of images, there may be a fingerprint on the lens that needs cleaning.

• **If your exposures are not perfect**, you can use a live histogram to make sure they are.

• **If your pictures are not the way you expect**, or the camera doesn't work as described in this book, it may be because the camera memorized a change you made to a setting and continues to use that setting even when you turn the camera off and back on. You can restore many settings to their factory defaults using the RESET command on the Set-up 1 menu tab.

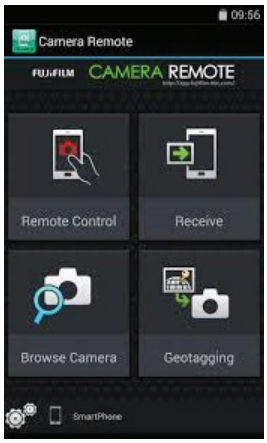
The optional adapter ring and lens hood.

• **To attach filters** or lens accessories you need an adapter ring (AR-X100) or the lens hood kit (LF-X100). This adapter accepts accessories that have 49mm threads.

• **To prevent accidentally pressing** points on the selector or the Q button settings you can hold down the MENU/OK button to lock and unlock them.

• **The camera captures images in the high quality RAW format**—they have an RAF extension in the filename. You can use the RAW CONVERSION setting on the playback menu to convert these images to the more common JPEG format or capture a RAW and JPEG version of each image you take. There are also photo-editing programs you can use to edit RAW images and generate JPEG copies.

•**With the FUJIFILM Camera Remote app**, you can focus and trigger the camera release from your smartphone or tablet without introducing blur from camera shake. You can also control settings such as shutter speed, aperture, exposure compensation, ISO sensitivity, film simulation, self-timer, and flash while "Touch AF" lets you focus from your phone or tablet, too.



The Camera Remote app.

STEP	DEVICE	DESCRIPTION
1.	Camera	Press the WIRELESS COMMUNICATION button
2.	Phone	Select the camera network in Wi-Fi settings
3.	Phone	Launch the FUJIFILM Camera Remote app
4.	Phone	Tap "Remote Control"
5.	Phone	Tap "Connect"
6.	Camera	After checking the name of device to which the camera is connected, press OK
7.	Camera	To turn off WiFi press the DISP/BACK button

• **Not all settings are available in all modes**. Click this link to download Fuji's *Restrictions on Camera Settings* PDF—http://fujifilm-dsc.com/en/manual/x30/appendix/restrictions/x30_restrictions_en.pdf

Topic 1–4. Using the Monitor and Viewfinder

TIPS

- When possible, use the optical viewfinder to conserve battery power.
- You can use your smart phone or tablet as a monitor if you download and install Fujifilm's camera remote app.
- The brightness and clarity of the EVF and LCD monitor can be adjusted using the SCREEN SET-UP options on the Set-up 2 menu tab.
- To make the LCD monitor more readable in bright sun hold down the VIEW MODE button to brighten the screen. Hold it down again when ready to leave this mode. When ON images on the screen will look overexposed in some light.
- Throughout this book when we say things are displayed on the screen, we assume the viewfinder or monitor is displaying information.
- The electronic viewfinder and LCD monitor show the scene through the lens after it has been processed by the camera's software. For this reason you can preview image brightness depth of field, exposure, and white balance.

The camera's LCD monitor and hybrid viewfinder can both be used to compose and playback images and display menus and settings. For this reason we sometimes just refer to "the screen" instead of spelling out both of them by name). The viewfinder has a number of advantages. For one thing, you can compose images even in bright sunlight when a monitor turns into a mirror. You can also use the diopter adjustment dial to bring the image into focus so you may not have to wear reading glasses when taking pictures. Finally, the optical viewfinder doesn't drain the battery as the LCD and electronic viewfinder do.

CHANGING THE VIEWFINDER/LCD DISPLAY

Control	Setting Choices
1. VIEW MODE button specifies if you view the scene on the LCD monitor or in the viewfinder.	Viewfinder only LCD only LCD with Eye Sensor Viewfinder with Eye Sensor
2. Viewfinder selection lever switches you between the electronic and optical viewfinders.	Optical viewfinder (OVF) Electronic viewfinder (EVF) Electronic range finder
3. DISP/BACK button specifies what information is displayed on the screen.	Standard (with histogram) Information (Off) Information display with LCD only

1. View Mode—Viewfinder or LCD Monitor

The VIEW MODE button on the back of the camera selects the LCD monitor or viewfinder. You can select either with or without the eye sensor When selected it turns on the viewfinder when it senses you bringing the camera to your eye—and can be set to turn off the monitor at the same time. When you remove your eye from the viewfinder it turns it off and turns the monitor back on.

2. Viewfinder Selection—Optical or Electronic Viewfinder

The Viewfinder selector lever on the front of the camera, when pressed to the right, toggles the viewfinder between the optical (OVF) and electronic (EVF) viewfinder.

• **The OVF (optical viewfinder)** lets you see the scene as if looking through a pane of clear glass.

A large white frame shows the area of the scene that will be captured in the image. There is room all around this frame so you can see what falls just outside the image area so you can adjust your composition accordingly.

Because the optical viewfinder window is offset from the lens you and the camera may not see the same view of the scene, especially when close to the subject. This effect, called *parallax*, is corrected in the X100T. When you focus close-up a correction icon is displayed and the large white frame in the optical viewfinder shifts so what you see is closer to what you get when you take the picture. (You must be using the optical viewfinder and CORRECTED AF FRAME must be set to ON in the Shooting 1 men's tab AUTOFOCUS SETTING section—the default is OFF).

TIPS

- OVF refers to the optical viewfinder.
- EVF refers to the electronic viewfinder.
- ERF refers to the electronic rangefinder.

• **The EVF (Electronic Viewfinder)** and LCD monitor show the scene through the lens, after it has been processed by the camera's software. For

this reason, you can preview image brightness, depth of field, exposure and white balance.

3. DISP/BACK—Information Display

The DISP BACK button scrolls through information shown on the screen and you can customize the display.

CUSTOMIZING THE STANDARD DISPLAY

1. Display the Shooting 3 menu tab and select DISP. CUSTOM SETTING.
2. Highlight OVF or EVF/LCD and press OK to display a list of settings.
3. Highlight any item listed in the table below and press OK to select or deselect it. Selected items are indicated by a check mark.
4. Press DISP/BACK to exit when settings are complete.

STANDARD DISPLAY SETTINGS

FRAMING GUIDELINE	FLASH
ELECTRONIC LEVEL	WHITE BALANCE
AF DISTANCE INDICATOR	FILM SIMULATION
MF DISTANCE INDICATOR	DYNAMIC RANGE
HISTOGRAM	FRAMES REMAINING
APERTURE/S-SPEED/ISO	IMAGE SIZE/QUALITY
EXP. COMPENSATION	MOVIE MODE & REC. TIME
PHOTOMETRY	BATTERY LEVEL

TIPS

- To have viewfinder information automatically rotate to match the orientation of the camera select the Set-up 2 menu tab, then select SCREEN SET-UP, EVF AUTOROTATE DISPLAYS and ON. The display in the LCD monitor is unaffected.
- The electronic viewfinder is so good you sometimes can't tell if you are using it or the optical viewfinder. You are using optical if you can see a small part of the lens in the lower right corner or the image is always in focus and may not be as bright as the electronic image.

Screen Set-up

The SCREEN SET-UP choice on the Set-up 2 menu tab let's you change a number of screen related settings including those in the following table:

THE SCREEN SET-UP MENU

IMAGE DISP.	Specifies how long an image is displayed immediately after capture.
EVF AUTOROTATE DISPLAYS	When ON indicators in the viewfinder rotate to match the camera's orientation.
PREVIEW EXP. IN MANUAL MODE	When ON you can preview exposure in manual shooting mode. Set to OFF when using a flash.
MONITOR SUNLIGHT MODE	Brightens the LCD monitor in bright light.
EVF BRIGHTNESS	Control electronic viewfinder brightness.
EVF COLOR	Adjusts the electronic viewfinder's hue.
LCD BRIGHTNESS	Controls LCD monitor brightness.
LCD COLOR	Adjusts the monitor's hue.
PREVIEW PIC. EFFECT	When ON you see the effects that settings have on image.
FRAMING GUIDELINE	Specifies framing grid in shooting mode.
AUTOROTATE PB	When ON images shot in portrait mode are displayed that way in playback.
FOCUS SCALE UNITS	Specifies units used for the focus distance indicator.

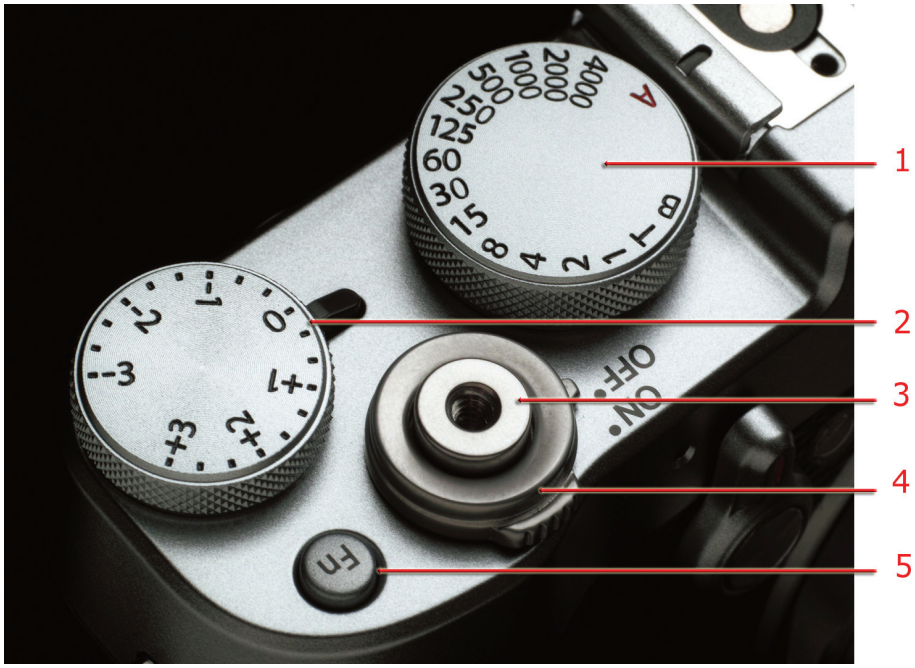
TIPS

- When the optical viewfinder is displayed you can change settings but can't see the settings themselves.
- If you turn on ELECTRONIC LEVEL the camera is level when the two lines overlap. The virtual horizon may not be displayed if the camera lens is pointed up or down.

Topic 1–5. Using Dials and Buttons

To operate the camera, you perform the most commonly used procedures with buttons, dials and levers. As you change settings, icons and other choices are often displayed in the viewfinder or on the monitor. If they aren't displayed as you like, press the VIEW MODE button on the back of the camera to cycle through the available setting displays.

Top of the Camera



TIPS

- Hold down the MENU button to lock or unlock the selector and Q button so you don't inadvertently change settings.
- The camera has to be awake before buttons such as Q, Playback, VIEW MODE or DRIVE will work. Press the shutter button down and release it to wake up the camera.

1. Shutter speed dial sets the shutter speed and the ability to freeze or blur motion. It also can be set to T for a time exposure or B for bulb when you want long time-exposures. Used in conjunction with the aperture ring on the lens you can set the camera to four shooting modes—program (P), shutter-priority (S), aperture-priority (A) , and manual (M).

2. Exposure compensation dial lightens or darkens images in auto shooting modes.

3. Shutter button locks focus and exposure when pressed halfway down and takes a picture when pressed all the way. Also pressing it halfway down wakes up the camera when it has gone to sleep to preserve battery power.

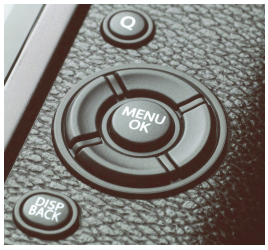
When you press the shutter button halfway down and focus is achieved the camera beeps twice and the focus area glows green. Focus and exposure will remain locked as long as you continue to hold the shutter button halfway down. If the camera is unable to focus, the focus frame turns red and a red !AF is displayed. Release the button and try again.

4. ON/OFF switch turns the camera on and off.

5. Fn button is a function button to which you can assign specific commands. By default it is set so pressing it starts and stops recording movies.

Back of camera

6. DRIVE button let's you select still image or continuous shooting and also bracket AE, ISO, film simulation, white balance, and dynamic range. You can also set it to capture multiple exposures and motion panoramas.



The selector has points you press to move a menu highlight up, right, down or left. The MENU button in the middle displays the shooting menu and the same button is used to confirm selections in menus.

7. VIEW MODE button specifies if the scene, information and menus are displayed in the viewfinder or on the LCD monitor. Holding this button down will toggle between brightening the screen and then returning it to normal brightness.

8. Playback button displays the photos you have taken and allows you to manage them.

9. Focus mode selector (on the side of the camera) selects manual focus (M), autofocus single (AF-S) or autofocus continuous (AF-C).

10. Delete button deletes selected images in playback mode. In shooting mode it acts as one of the 7 function buttons and is programmed to let you select a metering mode.

11. WiFi/Fn button is used to connect to an iPhone, tablet or other network. Using the free Fujifilm Camera Remote app it lets you use your phone or tablet as a wireless remote control for the camera. It can also be reprogrammed as a function button.

12. Command dial moves the highlight around menus, scrolls through settings on the Quick menu. Pressing it like a button enlarges the active focus area during shooting and selects manual focus modes—STANDARD, DIGITAL SPLIT IMAGE or FOCUS PEAK HIGHLIGHT. In playback mode it zooms images.

13. AEL/AFL button locks focus or exposure so you can take your finger off the shutter button. In manual focus mode you can use this button for back button autofocus.

14. Q button displays and hides the Quick menu used to quickly change camera settings. On this menu you can also save seven different sets of settings in what are called "setting banks".

15. Selector has four points and a MENU/OK button in the middle. The four points are used to move a highlight to select items and to also serve the purpose of function buttons. When MENU/OK is held down until an ON or OFF icon is displayed it locks and unlocks the selector and Q button. When you press and release MENU/OK a menu is displayed. Which menu it is depends of whether you are in shooting or playback mode.

16. DISP/BACK button backs you up in menus and closes the menu.

Front of Camera

17. **Viewfinder mode lever**, when pressed to the right toward the shutter button, switches the viewfinder between optical (OVF) and electronic (EVF). When pressed to the left with the optical viewfinder selected, it displays the electronic rangefinder —(a small electronic window that shows the focus area).

18. Aperture ring on the lens is used to select an aperture setting to control how depth of field is captured. Used in conjunction with the shutter speed dial to set the camera to four shooting modes—program (P), shutter-priority (S), aperture-priority (A) , and manual (M).

19. Focus ring on the lens is used to manually focus when the Focus mode selector (9 above) is set to M (manual).

Topic 1–6. Using Tabbed Menus

TIPS

- Some menu settings can be accessed by holding down a function button.
- Hold down DISP/BACK to change function key assignments.
- Some menu commands may be dimmed, indicating that they are not available. In many cases, another setting is preventing them from working.
- Pressing MENU/OK will not display the menu unless you first wake up the camera.
- You can only scroll through commands in the current group such as Shooting or Set-up. To scroll through the commands in a different group you first have to select a tab in that group

The X100T's menus lists all of the shooting, playback and set-up settings that are not controlled by buttons, dials, and levers. Related menu commands are grouped together on tabs. Each tab belongs to a group—Shooting, Set-up or Playback—and has a number such as Shooting 3 menu tab or Set-up 1 menu tab. You display menus by pressing the MENU/OK button. When you do so the tabbed menu is displayed on the LCD monitor or in the viewfinder, depending on how the VIEW MODE is set.

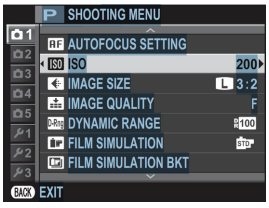
• **Shooting menu** tabs, of which there are 5, are displayed when the camera is in any shooting mode. Many of these settings affect the quality of your images.

• **Set-up menu** tabs, of which there are 3, are displayed in Shooting and Playback modes and generally do not affect image quality.

• **Playback menu** tabs, of which there are 3, are displayed when you press MENU/OK with the camera in playback mode (the arrowhead icon) and list commands you use to view and manage images.

USING TABBED MENUS

- To display the menu press MENU/OK. There are three columns on each tab—the tab number, the command, and the current setting.
- To display the menu in the viewfinder or on the LCD monitor press VIEW MODE.
- To move between a tab and commands, press the left and right point on the selector.
- To move up and down through tabs or commands press the up or down point on the selector. When you reach the first or last tab or command in the group, the highlight wraps around to the first or last command in the group.
- To display options for a highlighted command, press the right point on the selector.
- To select the highlighted setting or option press MENU/OK.
- To back up through previously selected menu settings press the DISP/BACK button
- To hide the menu and immediately return to shooting mode, press the shutter halfway down.



Menus are arrange in a series of related tabs for—Shooting, Set-up and Playback

Resetting All Settings

Since changes to menu settings are often remembered, they can accumulate and cause problems with subsequent photos. If things don't work the way you expect, you can use the RESET command on the Set-up 1 menu tab to reset shooting or set-up menus to their default settings.

Some settings are not reset including DATE/TIME, TIME DIFFERENCE, SHUTTER COUNT, custom white balance, wireless network and PC auto save options, and custom settings banks created using the Q menu or the EDIT/SAVE CUSTOM SETTING.

RESETTING SHOOTING AND SET-UP MENU SETTINGS

1. Press MENU/OK and display the Set-up 1 menu tab.
2. Highlight RESET and press MENU/OK to display its choices and highlight one of the following:
   - SHOOTING MENU RESET to reset the shooting menu.
   - SET-UP RESET to reset the Set-up menu.
3. Press OK to display a prompt asking you to confirm the reset.
4. Highlight OK and press MENU/OK to display a prompt asking you to select a language. Do so and press MENU/OK.

The Shooting Menu

Settings on the Shooting menu's 5 tabs normally have some effect on image quality. These settings can be restored to their factory defaults using the SHOOTING MENU RESET command on the Set-up 1 menu tab.

Command	Description
AUTOFOCUS SETTING	Displays submenu of autofocus settings
ISO	Sets the ISO
IMAGE SIZE	Sets the image size and aspect ratio
IMAGE QUALITY	Selects JPEG and RAW image formats
DYNAMIC RANGE	Adjusts contrast
FILM SIMULATION	Selects look of film types
FILM SIMULATION BKT	Creates images using up to 3 film types
ND FILTER	Turns neutral density filter on or off
COLOR	Adjusts color density
SHARPNESS	Sharpens or softens edges and lines
HIGHLIGHT TONE	Adjusts the brightness of highlights
SHADOW TONE	Adjusts the brightness of shadows
NOISE REDUCTION	Reduces noise from high ISO settings
LONG EXPOSURE NR	Reduces noise from long exposure times
WHITE BALANCE	Sets and creates white balance settings
SELECT CUSTOM SETTING	Recalls settings saved with EDIT/SAVE CUSTOM SETTING
EDIT/SAVE CUSTOM SETTING	Creates and saves custom camera settings
FUNCTION (Fn) SETTING	Assigns tasks to function buttons
DISP. CUSTOM SETTING	Specifies information displayed on camera's screens
CONVERSION LENS	Adjusts settings for conversion lenses
MF ASSIST	Selects manual focusing aides
ADVANCED FILTER	Specifies filter effects for JPEG images
INTERVAL TIMER SHOOTING	Adjusts settings for interval timer
SELF-TIMER	Turns self-timer on and off for 2 or 10 seconds
AE/AF-LOCK MODE	Specifies how AEL/AFL button works
AE/AF-LOCK BUTTON	Sets the button to lock exposure, focus or both
PHOTOMETRY	Specifies type of exposure metering

Command	Description
INTERLOCK SPOT AE & FOCUS AREA	Links spot metering and focus area
RED EYE REMOVAL	Reduces red-eye caused by flash when shooting with Intelligent Face Detection
SAVE ORG IMAGE	Saves unprocessed copies of pictures taken using red-eye removal
FLASH MODE	Specifies flash modes
FLASH COMPENSATION	Lightens or darkens flash images
SHUTTER TYPE	Selects mechanical, electronic or both shutters
MOVIE SET-UP	Displays submenu of movie settings
WIRELESS COMMUNICATION	Wirelessly connects to smart phone or tablet

The Set-Up Menu

Settings on the Set-up menu's 3 tabs generally affect the camera's operation and not image quality. These settings can be restored to their factory defaults using the SETUP RESET command on the Set-up 1 menu tab.

Command	Description
DATE/TIME	Sets camera's calendar and clock
TIME DIFFERENCE	Sets home and away times
LANGUAGE	Specifies language in menus and settings
RESET	Resets changes made through Shooting and Set-up menus
SILENT MODE	Turns off speaker, flash, and AF illuminator
FRAME NO.	Specifies if image numbers continue or reset when you change memory cards
FOCUS RING	Reverses direction of focus ring rotation
FOCUS CHECK	Enlarges focus area when you turn focus ring
SOUND SET-UP	Adjusts sound setting
SCREEN SET-UP	Displays submenu of display settings
SELECTOR BUTTON SETTING	Specifies roles played by selector points
EDIT/SAVE QUICK MENU	Specifies items in the quick menu
POWER MANAGEMENT	Adjusts power management settings
SHUTTER COUNT	Approximate times shutter has been released
EDIT FILE NAME	Replaces the default file name prefix
WIRELESS SETTINGS	Adjusts settings for connection to wireless networks.
PC AUTO SAVE SETTING	Specifies an upload destination
GEOTAGGING SET-UP	View location data downloaded from a smartphone and assign it to photos
instax PRINTER CONNECTION SETTING	Connects to a FUJIFILM instax SHARE printer
COLOR SPACE	Select sRGB or AdobeRGB color spaces
FORMAT	Prepares a memory card for your camera

Topic 1–7. Using the Quick Menu

TIPS

- The Quick menu cannot be used to adjust custom white balance, choose a color temperature, or adjust settings for auto ISO. To change these settings use a function button or menu command.
- To select one of the 7 custom setting banks directly, display the Shooting 3 menu tab, select SELECT CUSTOM SETTING and then select the setting bank you want to use.
- Instead of changing settings on the Quick menu you can change them using the Shooting menu or buttons.
- Planning your setting banks can be confusing. To help you get things organized, worksheets are provided in Topic 1–13.
- Pressing Q only displays the Quick menu when the camera is awake.

If there is a particular combination of settings you use frequently, you can store them in what Fuji calls a "setting bank" on the Quick menu. The bank displayed when you press the Q button is called BASE but there are 7 custom banks, C1–C7, so you can have seven different groups of settings. When you first begin, all banks have the same settings so it doesn't matter which you choose. To make them useful you change the settings on one or more of them for specific situations. For example, you can set one bank's settings to capture macro subjects and one to capture action shots, then use any of the other banks to store settings you like to use in other situations. Later, when you want to use that same group of settings again you display the Quick menu and select the bank where you stored them.

The way you press or hold down the Q button determines what changes you can make to the Quick menu and its 7 setting banks. The three ways to use this button are as follows.

Q Button	Functions You Can Perform
1. Press Q and release	• View the Quick menu • Temporarily change current BASE settings • Select custom setting banks 1–7
2. Press Q and release to display Quick menu then hold down Q (You can also use the Shooting 3 menu tab's EDIT/SAVE CUSTOM SETTING).	• Select a setting bank 1–7 • Save current camera settings to the selected setting bank • Adjust current default settings in bank • Reset bank to factory defaults
3. Hold down Q when Quick menu isn't displayed	• Replace one Quick menu setting with another • Delete menu settings and their icons from the Quick menu and all 7 setting banks.

Understanding BASE and Setting Banks

When you press the Q button to display the Quick menu, the icon selected in the upper left corner of the screen reads BASE and a prompt at the top of the screen reads SELECT CUSTOM SETTING but this prompt will change as you select other icons.

TIPS

When using the Quick menu the only controls you use are:

- Points on the selector
- Command dial
- MENU/OK
- DISP/BACK

The Quick menu displays icons for 15 settings, any of which you can select and change by turning the command dial. The current settings are displayed on the icons and when you select one, its name is displayed at the top of the screen.

BASE is the setting bank where the camera stores your most recent settings, including those you make on the Shooting menu or function buttons. When you take a picture, it is these settings that the camera uses. You can adjust these settings using the camera's tabbed menus, but they have been brought

TIPS

- When you adjust settings using the menu or custom setting banks C1–C7 the adjustments are immediately carried to the BASE setting bank.
- To select a setting bank from the tabbed menu display the Shooting 3 menu tab, highlight SELECT CUSTOM SETTING and then select the desired bank.
- If you change a setting on the Quick menu that affects another setting, the affected settings is displayed in yellow and reset if necessary. For example, if you set the ISO to h51200 and then change the IMAGE QUALITY to RAW, the ISO icon changes to yellow and the ISO changes to 6400.

TIPS

- The 5 universal settings that change in all banks when changed in one are:

IMAGE QUALITY
IMAGE SIZE
LCD BRIGHTNESS
FLASH MODE
AF MODE

When you change these on the Quick menu you do not see a red dot displayed on their icon.

together on the Quick menu to make changing them easier. All you have to do is press points on the selector to highlight one of the settings and then turn the command dial to scroll through its options. Any changes you make when the BASE bank is displayed remain changed until you change them again or switch to one of the 7 custom setting banks by selecting BASE and turning the command dial. If you do switch banks, the settings on the new bank replace any settings on the BASE bank since they are the most recently selected settings. Setting made on tabbed menus are also carried to BASE.

Things get a little more confusing when you select one of the 7 custom setting banks C1–C7 and change a setting there.

- If a setting icon, such as ISO, displays a red dot as you change it, it means that setting will not be saved in the selected setting bank. Instead it will be transferred to BASE and returned to the default setting in the setting bank where you changed it. The dot disappears after the setting has been transferred.
- If the setting, such as IMAGE QUALITY, does not display a red dot when you change it, it is one of the five universal setting that will affect all 7 setting banks and BASE. These universal settings (see Tips to the left) have to be the same in all banks.

Let's look at an example. (Try this with your own camera as you read along).

1. Press the Q button to display the Quick menu and turn the command dial to select bank C2.

2. Change the ISO from 200 to 6400 and as you do so a red dot is displayed to indicate the setting will be transferred to BASE.

3. Change IMAGE QUALITY from FINE to RAW+F and as you do so no red dot is displayed indicating it is a universal setting and will change in BASE and all 7 setting banks.

4. Press DISP/BACK to hide the Quick menu.

5. Press Q to return to the Quick menu and BASE is displayed with the ISO changed to 6400 and the image quality to RAW+F.

6. Display bank C2, where you made the changes, and you'll see it has returned to it's default setting of ISO 200 and the IMAGE QUALITY remains changed to RAW+F.

1. Adjusting Settings

The primary purpose of the Quick menu is to make it easy to temporarily adjust settings that have been previously set. Here is how:

ADJUSTING SETTINGS

1. Press Q to display the Quick menu and the BASE setting bank.
2. To select one of the 7 setting banks press points on the selector to highlight BASE, then turn the command dial.
3. To adjust a setting in the current setting bank, press points on the selector to highlight it then turn the command dial. A settings name is displayed at the top of the screen when you select it and its actual setting is indicated in it's icon.
4. When finished, press the shutter button halfway down or press Q, MENU/OK, or DISP/BACK button to close the Quick menu.

2. Adjusting, Changing and Resetting Default Settings

Changes you make to setting banks are only temporary. To make them your new defaults you need to change their settings on another screen. All 7 custom banks have the same settings when you begin but you can add, delete or change the settings on each at will. (During this procedure you can also select RESET to restore a bank's factory default settings. One shortcut to creating a setting bank is the SAVE CURRENT SETTINGS command. To use this you first set up the camera the way you like it in a specific situation. You then save those settings to one of the custom setting banks.

REPLACING SETTINGS

When changing one setting for another you have these choices:

SAVE CURRENT SETTINGS
ISO
DYNAMIC RANGE)
WHITE BALANCE-
NOISE REDUCTION
FILM SIMULATION
HIGHLIGHT TONE
SHADOW TONE
COLOR
SHARPNESS
RESET

ADJUSTING, CHANGING AND RESETTING DEFAULT SETTINGS

1. Press and release the Q button to display the Quick Menu then hold down Q to display a list of the setting banks CUSTOM 1–7. (You can also select the Shooting 3 menu tab's EDIT/SAVE CUSTOM SETTINGS).
2. Highlight one of the setting banks and press the right point on the selector to display a submenu of the settings you can adjust in that bank. (See the REPLACING SETTINGS box to the left.) Do one of the following:
   - Select a camera setting you want to adjust and press the right point on the selector to display the range of available options. Highlight your choice and press MENU/OK to select it.
   - Select RESET to restore the bank's factory default settings.
   - Select SAVE CURRENT SETTINGS to save the current camera settings to the current bank—replacing any already there.
3. Repeat Steps 2 to change other settings.
4. Press the DISP/BACK button and the prompt asks CUSTOM 1-7 SET OK?
5. Highlight OK and press MENU/OK.
6. Press DISP/BACK to close the menu then press Q to display the Quick menu with BASE highlighted. Turn the command dial to display the setting bank you changed.

3. Specifying Quick Menu Choices

What if you often photograph weddings, or parties, or like photographing sports or cityscapes at night? It's easy to create custom setting banks for these kinds of situations. When doing so, any settings you add, delete or replace affects all setting banks.

While hiking, I have one setting bank set to capture macro images and another set to capture action. I leave the camera set to the action settings as I hike so if I encounter something unexpected I have my best chance of capturing it. If I encounter a subject that is stationary, I can switch to the macro settings, or take time to change other settings.

TIPS

- When you selected a setting you are replacing or deleting and press OK its Quick menu number is displayed at the top of the screen. Icons on the Quick menu are numbered 1–16 from left to right, top to bottom.

QUICK MENU DEFAULT SETTINGS	ALTERNATE SETTINGS
SAVE CURRENT SETTINGS	FLASH COMPENSATION
ISO (200)	MF ASSIST
DYNAMIC RANGE* (100)	MOVIE MODE
WHITE BALANCE* (Auto)	MOVIE ISO
NOISE REDUCTION (0)	PHOTOMETRY
IMAGE SIZE L/3:2	MIC LEVEL ADJUSTMENT
IMAGE QUALITY (FINE)	SILENT MODE
FILM SIMULATION* (STD)	EVF/LCD BRIGHTNESS (0)
HIGHLIGHT TONE* (0)	EVF/LCD COLOR
SHADOW TONE* (0)	ADVANCED FILTER*
COLOR* (0)	CONVERSION LENS
SHARPNESS* (0)	SHUTTER TYPE
SELF-TIMER (OFF)	ND FILTER
AF MODE (AREA)	FACE DETECTION
FLASH MODE (OFF)	NONE

There are 15 slots in each setting bank and 29 settings from which to choose, all listed in the table above. (Default settings are shown in parentheses). In this procedure you can also select NONE and press OK to remove the selected setting from the Quick menu and all setting banks. Since there are 15 settings on the Quick menu you may want to delete or replace those you will never use. For example, if you only shoot RAW images you can delete those marked with an asterisk *) in the table above. When shooting RAW these settings only affect the image's preview and not the RAW image itself. If you shoot RAW+JPEG the settings will also affect the JPEG image.

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

The position of each setting on the Quick menu is assigned a number 1–16 where 1 is BASE and the others are counted from left to right, top to bottom.

SPECIFYING QUICK MENU CHOICES

1. With no menu on the screen hold down Q to display the 15 current setting icons. (You can also display the Shooting 3 menu tab and select EDIT/SAVE CUSTOM SETTINGS).
2. Highlight the setting you want to change or delete and press OK to display settings you can replace the current ones with.
3. Highlight your choice (NONE deletes the setting) and press OK.
4. Repeat Steps 2-3 to change or delete other settings.
5. Press MENU/BACK to hide the menu then press Q to display the Quick Menu.
6. Highlight BASE and turn the command Dial to display the setting back you changed.

To restore settings and their icons that you have previously deleted, you can repeat the same steps you used to delete them or you can use the RESET command to reset Set-up menu commands as discussed in Topic 1–6. (The Reset the Shooting menu choice resets only the BASE. (Resetting the Shooting menu only resets the BASE settings).

Topic 1–8. Using Function Buttons

You can assign frequently used settings to any of 7 function buttons. Two of these buttons are labeled Fn and the others are the Delete button and the 4 points on the selector. When you press one of these buttons you execute the assigned command or display options from which you can choose. Altogether there are 25 settings from which you can chose for each of these buttons. All 7 of them have been assigned defaults as shown in the following table.

TIPS

• Planning your function button assignments can be confusing. To help you get things organized, worksheets are provided in Topic 1–13.

Function Button	Location	Default Function
Fn1	Top of camera—Fn	MOVIE
Fn2	Top point on selector	MACRO
Fn3	Left point on selector	FILM SIMULATION
Fn4	Right point on selector	WHITE BALANCE
Fn5	Down point on selector	FOCUS AREA
Fn6	Delete button—trash can icon	PHOTOMETRY
Fn7	Back of camera—Wi-Fi	WIRELESS COMMUNICATION

To change the function of any of the 7 function buttons you can hold down the button to display a list of settings or use the tabbed menu.

PROGRAMMING FUNCTION BUTTONS

1. Do one of the following:
   - Hold down one of the 7 function buttons to display a list of the functions you can assign.
   - Hold down the DISP/BACK button or display the Shooting 3 menu tab and select FUNCTION (Fn) SETTING. A setting screen is displayed listing function keys Fn1–Fn7. Press the selector up or down to highlight the desired button (its location will be shown on an image of the camera) and press the right point on the selector.
2. Select any of the functions listed in the table below to replace the current one and press MENU/OK (Select NONE to assign no function to the selected button).
3. If necessary, press DISP/BACK to hide the menu.

Default Settings	Alternate Settings
Fn 1 MOVIE Fn 2 MACRO Fn 3 FILM SIMULATION Fn 4 WHITE BALANCE Fn 5 FOCUS AREA Fn 6 PHOTOMETRY Fn 7 WIRELESS COMMUNICATION	MULTIPLE EXPOSURE PREVIEW DEPTH OF FIELD ISO SELF-TIMER IMAGE SIZE IMAGE QUALITY DYNAMIC RANGE ND FILTER CORRECTED AF FRAME FLASH MODE FLASH COMPENSATION SELECT CUSTOM SETTING FACE DETECTION PREVIEW PIC. EFFECT HIGH PERFORMANCE RAW CONVERSION LENS SHUTTER TYPE NONE

Topic 1–9. Managing Images in Playback Mode

The playback mode icon.

When playing back your images you can scroll through them one at a time or by rows of up to 10 small thumbnails. Once you find an image you can magnify it, display information about it, or erase, rotate or protect it. To use playback mode you use buttons and menu commands

Using Playback Mode Buttons

When viewing and managing your images, most of the commonly used procedures are available on buttons and dials.

The Delete button icon.

USING BUTTONS AND DIALS IN PLAYBACK

- To display playback, press the Playback button. The last image you shot or looked at will be displayed.
- To display images in the electronic viewfinder or LCD monitor, press the VIEW MODE button and Viewfinder mode lever. You cannot display images in the optical viewfinder.
- To scroll through the images press points on the selector, hold a point down, or turn the focus ring on the lens.
- To zoom into and out of the focus point press the command dial in as if it were a button.
- To reduce images turn the command dial to the left.
- To zoom in on the focus point press the command dial in like a button.
- To return an image to single full-frame view turn the command dial or press MENU/OK.
- To enlarge an image turn the command dial to the right.
- To scroll around a an enlarged image press points on the selector. A small navigation window shows you the image area being displayed.
- To delete pictures press the Delete button when an image is displayed full frame and choose FRAME, SELECTED FRAMES or ALL FRAMES. The SPECIFIED images will be deleted from a memory card, but if no card is inserted they will be deleted from internal memory.
- To scroll through information about the selected image press the DISP/BACK button. One screen displays a histogram discussed in Topic 2–17.
- To rate the current picture press DISP/BACK one or more times to display FAVORITES and then press the selector's up point to select from zero to five stars. To view favorites use the IMAGE SEARCH command on the Playback menu.

TIPS

- You can recover photos deleted by mistake provided you don't first save other photos on the same card. One program you can use to do this is PhotoRescue at (http://www.datarescue.com/photorescue/) but you can find others by Googling "digital image recovery".
- Fuji refers to images as "frames".

Using Menus in Playback

Less frequently used commands are listed on the Playback menu. To use these menus you press the Playback button to switch to playback mode, then press the MENU/OK button to display the menu. Many of these procedures can also be done on your computer after you transfer the images.

TIPS

- Just captured images can be briefly previewed immediately after capture. To do so select IMAGE DISP on the SCREEN SET-UP setting on the Set-up 2 menu tab and then select:
- CONTINUOUS displays them until you press MENU/OK or press the shutter button halfway down. To zoom and unzoom the active focus point, press the command dial.
- 1.5 SEC or 5 SEC displays them for the specified time or until you press the shutter button halfway down.
- OFF (the default) does not display pictures.

Menu Command	Description
RAW CONVERSION	Converts RAW images to JPEGs
ERASE	Deletes images from the card or memory
CROP	Crops the selected image
RESIZE	Creates a smaller copy of the selected image
PROTECT	Protects images from being inadvertently deleted
IMAGE ROTATE	Rotates images to the desired orientation
RED EYE REMOVAL	Removes red-eye caused by a flash
SLIDE SHOW	Displays images in the desired sequence
PHOTOBOOK ASSIST	Creates books of your photos
MARK FOR UPLOAD TO	Selects photos for upload using MyFinePix Studio (Windows only).
IMAGE SEARCH	Searches for images by various criteria
COPY	Makes a copy of the selected image
PRINT ORDER (DPOF)	Specifies which images are to be printed
instax PRINTER PRINT	Prints images on FUJIFILM instax SHARE printers
DISP ASPECT	Specifies how 3:2 images are displayed on TV
WIRELESS COMMUNICATION	Wirelessly connects to a smartphone or tablet
PC AUTO SAVE	Specifies an upload destination

Playback on a TV

To show your photos on a TV you need a TV with an HDMI cable connection and an HDMI cable no more than 4.9 feet (1.5 m) long. (The TV can only be used for playback, not shooting).

The DISP ASPECT setting on the Playback 3 menu tab lets you specify how High Definition (HD) devices display pictures with an aspect ratio of 3 : 2. (This option is available only when an HDMI cable is connected).

TIPS

- You can't select protected images to be erased, or erase them.
- Protected images are deleted with the *Format* command.

CONNECTING TO A TV SET

1. Turn the camera off.
2. Insert the smaller micro HDMI end of the cable into the compartment on the right side of the camera. Insert the larger end into the HDMI connector on the TV.
3. Turn on the TV and set it's input to the HDMI connector you used.
4. Turn on the camera on and press the Playback button so the camera monitor turns off and pictures and movies are played back on the TV. To adjust volume use the television volume controls.

Transferring Images

At some point you will probably want to move your images from the camera to a computer. The camera has a USB cable connection and software to do this but most experienced photographs just use their computer's operating system that treats a memory card just like a hard drive. All that's needed is an SD card slot in the computer or a card reader connected to a its USB port. You can then just drag and drop images just as you do other image files on a hard drive.

Topic 1–10. How an Image is Captured

Beginning with the very first, all cameras have been basically black boxes with a lens, an aperture, and a shutter. The big difference between traditional film cameras and digital cameras is how they capture the image. Instead of film, digital cameras use a solid-state device called an *image sensor*. In a few digital cameras the image sensor is a *charge-coupled device* (CCD), but in most, including the X100T, it's a *CMOS sensor*. On the surface of these postage stamp-sized silicon chips are millions of photosensitive diodes, each of which captures a single pixel in the photograph to be.

When you take a picture the shutter opens briefly and each pixel on the image sensor records the brightness of the light that falls on it by accumulating an electrical charge. The more light that hits a pixel, the higher the charge it records. Pixels capturing light from bright highlights in the scene will have high charges. Those capturing light from dark shadows will have low charges.

Animation

Click to see how all cameras are just dark boxes.

After the shutter closes to end the exposure, the charge from each pixel is measured and converted into a digital number. This series of numbers is then used to reconstruct the image by setting the color and brightness of matching pixels on the screen or printed page.

Animation

Click to see where the name "charge-coupled device" comes from.

It may be surprising, but pixels on an image sensor capture brightness, not color. They record the *gray scale*—a series of tones ranging from pure white to pure black. How the camera creates a color image from the brightness recorded by each pixel is an interesting story.

The gray scale, seen best in black and white photos, contains a range of tones from pure black to pure white.

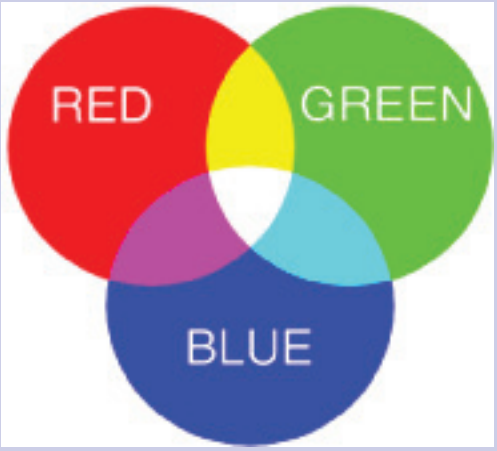
When photography was first invented in the 1840s, it could only record black and white images. The search for color was a long and arduous process, and a lot of hand coloring went on in the interim (causing one photographer to comment "so you have to know how to paint after all!"). One major breakthrough was James Clerk Maxwell's 1860 discovery that color photographs could be created using black and white film and red, blue, and green filters. He had the photographer Thomas Sutton photograph a tartan ribbon three

times, each time with a different color filter over the lens. The three black and white images were then projected onto a screen with three different projectors, each equipped with the same color filter used to take the image being projected. When brought into alignment, the three images formed a full-color photograph. Over a century later, image sensors work much the same way.

Colors in a photographic image are usually based on the three primary colors red, green, and blue (RGB). This is called the *additive color system* because new colors are formed by mixing in other colors. This RGB system is used whenever light is projected to form colors as it is on the display monitor. Another color system uses cyan, magenta, yellow and black (CMYK) to create colors. This system is used in a few sensors and almost all printers since it's the color system used with reflected light.

Animation

Click to explore how red, green and blue can create full color images.



RGB uses additive colors. When all three are mixed in equal amounts they form white or any other tone on the gray scale. When red and green overlap they form yellow, and so on.

Animation

Click to explore how cyan, magenta and yellow can also create full color images.

Animation

Click to explore how more pixels give sharper images.

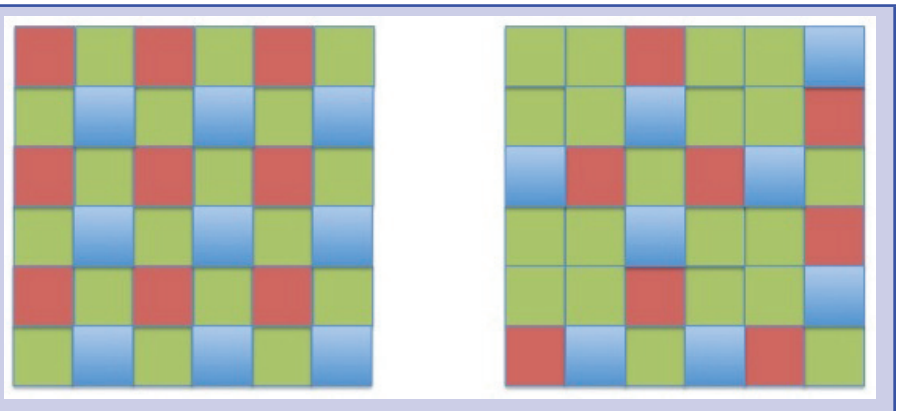
Since daylight is made up of red, green, and blue light; placing red, green, and blue filters over individual pixels on the image sensor can create color images just as they did for Maxwell in 1860. Using a process called *interpolation*, the camera computes the actual color of each pixel by combining the color it captured directly through its own filter with the other two colors captured by the pixels around it. How well it does this is affected in part by the image format, size, and compression you select.

Animation

Click to see the effects of compression.

TIPS

- The X100T captures 14-bit RAW images that have four times the brightness and color information captured in the 12-bit formats used by many other cameras.
- The sensor in the X100T is an APS-C X-Trans CMOS II. It measures 0.92 x 0.6 inches (23.6 x 15.6mm.



Because the standard Bayer pattern (left) is so regular, the camera needs a low-pass filter to avoid moire in images. The problem is that this filter lowers resolution. The Fuji pattern (right) has a higher degree of randomness that reduces moiré without a low-pass filter so the sensor can capture the full unfiltered resolution.

Animation

Click to see how pixels are printed using dots of colored ink.

Topic 1–11. Selecting An Aspect Ratio & Size

The size of an image is determined by the number of pixels on the sensor used to capture an image. Both the image size and aspect ratio affect the size. The X100T lets you choose from three aspect ratios and 3 image sizes for each ratio—the largest being 4896 x 3264 in the 3:2 aspect ratio. Since good prints can be made using 200 pixels per inch you can calculate that from an image of this size you can make a good 24 x 16 inch print.

Size	Aspect Ratio	Pixel count	Megapixels
L	3:2	4896 x 3264	16m
L	16:9	4896 x 2760	1.4m
L	1:1	3264 x 3264	11m
M	3:2	3456 x 2304	8M
M	16:9	3456 x 1944	7M
M	1:1	2304 x 2304	5M
S	3:2	2496 x 1664	4M
S	16:9	2496 x 1408	4M
S	1:1	1664 x 1664	3M

TIP

- 16:9 is ideal for display on HDTV sets and other devices that use the HDTV format.
- 3:2 is the same aspect ratio as 35mm film and is best for 5 x 7 inch prints and postcards.
- 1:1 is the same format used by many medium format cameras such as the Hasselblad. It is also the standard aspect ratio for Instagram images.

Aspect Ratios

The aspect ratio is the relationship between the width and height of an image. For example, 35mm film is 1.5 inches wide by 1 inch high so its aspect ratio is 1.5:1 referred to as 3:2 to eliminate the decimal. The X100T offers you a choice of three aspect ratios—16:9, 3:2 and 1:1. The 3:2 aspect ratio is the same as the image sensor and monitor. It also has the most pixels—up to 4896 x 3264 so if you use this mode, all other aspect ratios and image sizes can be cropped out of your images. The only reason to change aspect ratios while shooting is because the viewfinder and monitor displays change to reflect the format you select so you can compose your images more accurately. When shooting RAW images the only aspect ratio you can use is 3:2.

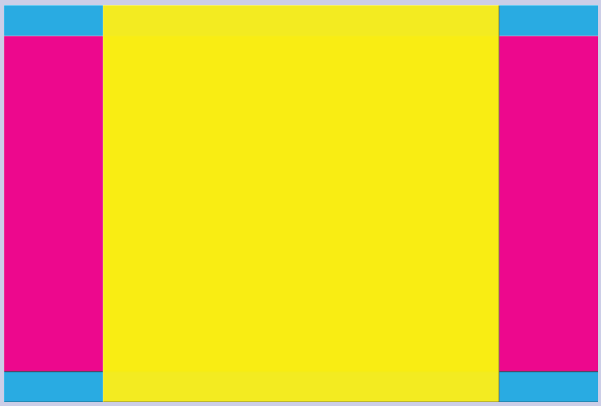
Only 3:2 images fill the screen. The other formats, like this 16:9 image, are shown at the selected aspect ratio against a black background.

Animation

Click to see the effects of pixelization as an image is enlarged.

Animation

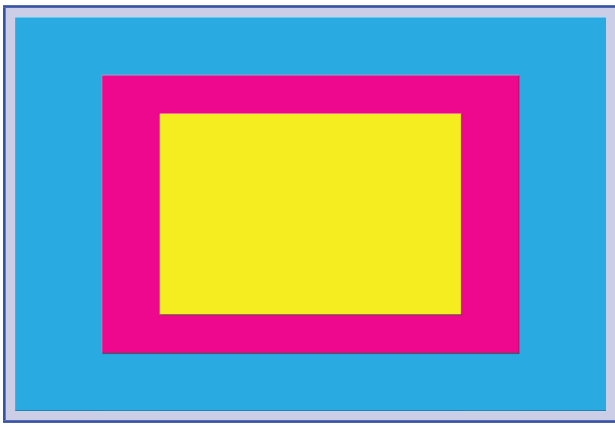
Click for an Excel work sheet that converts pixels into print sizes.



Here are the aspect ratios of 3:2, 16:9 and 1:1.

Image Sizes

Image Sizes can be set to large (the default), medium and small and their aspect ratios can be set to 3:2 (the default), 1:1 or 16:9.



Here are the relative sizes of Large, medium and small images. Their size in pixels depends on which aspect ratio you have selected.

TIPS

- If you select IMAGE SIZE on the Shooting 1 menu tab when you highlight a size its dimensions in pixels, its size in bytes, and the number that will fit on the current card are displayed on the bottom of the screen.
- The screen indicates how many more images can be taken at the current size and quality settings.

Size	Aspect Ratio
L	3:2
L	16:9
L	1:1
M	3:2
M	16:9
M	1:1
S	3:2
S	16:9
S	1:1

SELECTING IMAGE SIZES & ASPECT RATIOS

1. Press the Q button to display the Quick menu. (You can also select IMAGE SIZE on the Shooting 1 menu tab).
2. Press points on the selector to highlight IMAGE SIZE.
3. Turn the command dial to select an image size and aspect ratio.
4. Press DISP/BACK to close the menu.

Digital photographs are actually mosaics of millions of tiny squares called *picture elements*—or just *pixels*. Like the impressionists who painted wonderful scenes with small dabs of paint, your computer and printer can use these tiny pixels to display or print photographs. To do so, the computer divides the screen or printed page into a grid of pixels. It then uses the values stored in the digital photograph to specify the brightness and color of each pixel in this grid—a form of painting by number.

TIP

- Since image size and quality are universal settings they are the same in all 7 setting banks. If you change them in one place you change them in all.
- Using function keys you can select image quality and size settings.

Any image that looks sharp and has smooth transitions in tones (top) is actually made up of millions of individual square pixels (bottom).

The quality of a digital image depends in part on the number of pixels used to create the image (sometimes referred to as *resolution*). At a given size, more pixels add detail and sharpen edges. However, there are always size limits. When you enlarge any digital image enough, the pixels begin to show—an effect called *pixelization*. This is not unlike traditional silver-based prints where grain begins to show when images are enlarged past a certain point.

Animation

Click here to explore the original meaning of "resolution".

The term "resolution" has two meanings in photography. Originally it referred to the ability of a camera system to resolve pairs of fine lines such as those found on a test chart. In this usage it's an indicator of sharpness, not image size. With the introduction of digital cameras the term began being used to indicate the number of pixels a camera could capture.

The size of a photograph is specified in one of two ways—by its dimensions in pixels or by the total number of pixels it contains. For example, the same image can be said to have 4896 × 3264 pixels (where "×" is pronounced "by" as in "4896 by 3264"), or to contain 15,980,544 or 16 megapixels (4896 multiplied by 3264).

Topic 1–12. Selecting Image Quality

The quality of an image depends in part on the number of pixels but also the format of the file and the amount of compression used to store it. Image quality on the X100T can be set to Fine or Normal JPEGS to be captured alone or combined with a RAW file. The default setting is for LARGE/FINE JPEGs but those may not be your best settings.

JPEG Images

Images, by default, are stored in a format called JPEG after its developer, the Joint Photographic Experts Group and pronounced "jay-peg". This file format not only compresses images, it also allows you to specify how much they are compressed. This is an occasionally useful feature because there is a trade-off between compression and image quality. Images in the fine mode are compressed less than those in the normal mode. Less compression gives you better images so you can make larger prints, but you can't store as many images. Because you can squeeze more smaller and more compressed images onto a storage device, there may be times when you'll want to switch to a smaller size and more compression, sacrificing quality for quantity. However, because you can't add pixels later and retain image quality, or remove the effects of compression after the fact. Therefore, it's usually best to use the largest available JPEG size and the least compression available. If you have to reduce either, you can do so later using a photo-editing program. If you shoot the image at a lower quality setting, you can never really improve it much or get a large, sharp print if you want one. The only drawback to this approach, and it's a minor one, is that higher quality images have larger file sizes. (At the time this book is being written 32 Gigabyte SD cards can be purchased for $15 or so and can store approximately 1000 RAW images.

Animation

Click here to explore the differences between JPEG and RAW formats.

TIP

• Although many camera settings such as white balance or dynamic range affect only JPEG images they do affect a RAW file's thumbnail and preview images. If you look at the RAW image in a photo-editing program it will look like the settings had an affect, but they can be easily undone (called "zeroing out".

RAW Images

In addition to JPEG images, the X100T also let's you shoot images using a RAW format. These images are often better than JPEGs because they are not processed in the camera, but on your more powerful computer. These RAW files contain every bit of the captured image data, unlike JPEGs which are processed in the camera with some data then being discarded. RAW files are 4896 x 3264 pixels in size and can be viewed, edited, and converted to other formats using most photo-editing software such as Photoshop or Lightroom or Fujifilm's free RAW IMAGE CONVERTER that's available free on their Web site. RAW images can be captured by themselves or with a companion fine or normal JPEG file. The later choice gives you an identical high quality RAW file and a smaller, more easily distributable file with the same name but a different extension—RAF vs JPG. If you select one of the RAW plus JPEG settings all shooting menu setting affect only the JPEG image and the RAW image's attached preview image. The RAW file itself is affected only by ISO, focus, aperture and shutter speed.

Pros and Cons

When choosing between JPEG and RAW formats, here are some things to consider about each format.

• RAW lets you decide on most camera settings after you've taken the picture, not before. For example, when you shoot a JPEG image under fluorescent lights, the camera adjusts the image to remove the yellow-green tint. Any

TIPS

- RAW image quality is not available with extended ISO sensitivity.
- L (100) is reset to ISO 200 and h51200, h5600, and h12800 are reset to ISO 6400 when RAW, FINE+RAW, or NORMAL+RAW is selected for *image quality.*

changes you make later are on top of this initial change. As one photographer put it, the changes have been baked into the cake, If you shoot an image in RAW format, the camera just captures the image as is and you decide later what white balance setting to use.

• RAW images can be processed again at a later date when new and improved applications become available. Your original image isn't permanently altered by today's generation of photo-editing applications.

• You can generate alternate versions of the same RAW image. For example, you can select different white balance settings and export each of these versions separately.

• RAW images let your exposures be off by 1 or 2 stops in either direction and sill be correctable in a photo-editing program. If you adjust a JPEG image by two stops distracting artifacts appear in the image.

TIP

- Since image size and quality are universal settings they are the same on all 7 setting banks. If you change them in one place you change them in all.
- Using function keys you can select image quality and size settings.

Admittedly, there are drawbacks to using RAW images.

• RAW files are larger than JPEGs but not unreasonably so.

• Since RAW images aren't converted to a viewable format in the camera, you have to process them on the computer and export them in a usable format when you want to e-mail them, post them on a Web site, print them, or import them into another program to create a slide show or publication. When you are done shooting for the day, there is still work to do.

• RAW images can only be viewed and edited on a computer using a program such as Adobe's Photoshop or Lightroom that supports the format. Since each camera company has defined its own proprietary RAW format and often changes it for new models, many operating systems and even photo-editing programs are unable to recognize some or all of these files—at least initially. For this reason camera manufacturers always supply a program to process RAW images along with their cameras—in the case of the X100T it's the RAW FILE CONVERTER. One huge question is whether newer software will still open these files in a decade or two.

Quality Choices

FINE

NORMAL

FINE+RAW

NORMAL+RAW

RAW

SELECTING IMAGE QUALITY

1. Press the Q button to display the Quick menu. (You can also select IMAGE QUALITY on the Shooting 1 menu tab).
2. Press points on the selector to highlight IMAGE QUALITY.
3. Turn the command dial to select an image quality.
4. Press DISP/BACK to close the menu.

Working with RAW Images

RAW images are never used directly and in that respect are much like negatives in film photography. You can view and edit them but to use or share them you need to export them in a more universal format, usually JPEG. There are ways you can view, edit or export your RAW files both in-camera and on the computer. The original image data are unaffected, allowing a single RAW image to be processed in a multitude of different ways.

• You can make JPEG copies of RAW images using the RAW CONVERSION option on the Playback menu.

CREATE JPEG COPIES OF RAW IMAGES

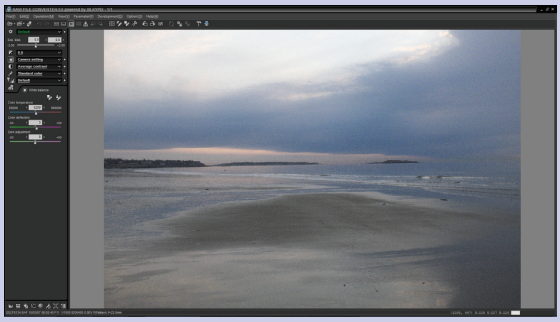
1. Display the desired picture in Playback mode.
2. Press MENU to display the Playback menu, highlight RAW CONVERSION and press MENU/OK to display RAW conversion options. (These options can also be displayed by pressing the Q button during playback when a RAW image is selected.
3. Select any of the following settings and adjust them:

Setting	Description
REFLECT SHOOTING COND.	Create copy using settings in effect when captured
PUSH/PULL PROCESSING	Adjust exposure by −1 EV to +3 EV
DYNAMIC RANGE	Enhance details in highlights
FILM SIMULATION	Simulate selected film type
WHITE BALANCE	Adjust white balance
WB SHIFT	Fine tune white balance
COLOR	Adjust color density
SHARPNESS	Sharpen edges
HIGHLIGHT TONE	Enhance highlight details
SHADOW TONE	Adjust shadows
NOISE REDUCTION	Reduce noise in image
COLOR SPACE	Select color space sRGB or AdobeRGB

TIPS

• The COLOR SPACE setting on the Set-up 3 menu tab lets you select a color space that determines the range of colors (gamut) in your images. Most monitors are calibrated for sRGB so that is the best choice if you mainly post images on the Internet. The optional color space, AdobeRGB has a wider gamut, designed for printing, but may display badly on a screen.

• RAW images can be viewed and edited using the RAW FILE CONVERTER software available free on Fujifilm's Web site. (Google's free Picasa also supports Fuji's RAW files.



The RAW FILE CONVERTER.

The Function Buttons

To toggle RAW image quality on or off for a single shot, assign RAW to a function button. Here is how it works with various image quality settings:

Image Quality	Pressing Function Button Temporarily Selects
JPEG	The equivalent JPEG+RAW setting
JPEG+RAW	The equivalent JPEG option
RAW	FINE

Topic 1–13. Customizing Your Camera—Worksheets

TIPS

- How to customize and use the Quick menu is discussed in detail in Topic 1–7.
- How to assign tasks to function buttons is discussed in Topic 1–8.
- Any settings you delete from the Quick menu or function buttons remain available through the tabbed menus so it just takes a few more steps to select them.

Since creating setting banks and assigning tasks to function buttons takes a little effort, it helps to plan ahead and keep a record of your settings.

Quick Menu Setting Banks

The camera has room for 7 custom setting banks so you will need a copy of this worksheet for each bank you plan on changing. To plan a setting bank:

1. Check off the 16 settings you want to assign in the √ column. The settings marked with an asterisk have no effect on RAW images so if you shoot RAW you can delete those settings to make room for others.

2. Write the name of each setting in one of the 15 spaces 2–16 in the "New Settings" column (BASE is 1 and can't be changed directly).

3. Refer to the box SPECIFYING QUICK MENU CHOICES in Topic 1–7 for instructions on assigning the settings

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

The position of each setting on the Quick menu is assigned a number 1–16 where 1 is BASE and the others are counted from left to right, top to bottom.

#	Quick Menu Settings	√	New Settings
1	BASE		Assigned automatically
2	ISO (200)		
3	DYNAMIC RANGE* (100)		
4	WHITE BALANCE* (Auto)		
5	NOISE REDUCTION (0)		
6	IMAGE SIZE L/3:2		
7	IMAGE QUALITY (FINE)		
8	FILM SIMULATION* (STD)		
9	HIGHLIGHT TONE* (0)		
10	SHADOW TONE* (0)		
11	COLOR* (0)		
12	SHARPNESS (0)		
13	SELF-TIMER (OFF)		
14	AF MODE (AREA)		
15	FLASH MODE (OFF)		
16	EVF/LCD BRIGHTNESS (0)		
Additional Settings	FLASH COMPENSATION		NOTES Write in the Setting Bank Number that these settings are for and describe the situations in which they will be used. _____ _____ _____ _____ _____
	MF ASSIST		
	MOVIE MODE		
	MOVIE ISO		
	PHOTOMETRY		
	MIC LEVEL ADJUSTMENT		
	SILENT MODE		
	EVF/LCD COLOR		
	ADVANCED FILTER*		
	CONVERSION LENS		
	SHUTTER TYPE		
	ND FILTER		
	FACE DETECTION		

Function Button Settings

The seven function buttons should be assigned tasks you perform most frequently. Those settings marked with asterisks have no effect on RAW images so can be reassigned if you usually shoot RAW only.

1. Write in the new tasks for each button to be changed in the "New Assignments" column in the table below.

2. Refer to the PROGRAMMING FUNCTION BUTTONS box in Topic 1–8 for instructions on assigning the settings

#	Default Assignments	New Assignments	Location on Camera
Fn 1	MOVIE		Top of camera—Fn
Fn 2	MACRO		Up point on selector
Fn 3	FILM SIMULATION*		Left point on selector
Fn 4	WHITE BALANCE*		Right point on selector
Fn 5	FOCUS AREA		Down point on selector
Fn 6	PHOTOMETRY		Delete button—trash can icon
Fn 7	WIRELESS COMMUNICATION		Back of camera—WiFi
Additional Settings	MULTIPLE EXPOSURE	NOTES	
	PREVIEW DEPTH OF FIELD	_____	
	ISO	_____	
	SELF-TIMER	_____	
	IMAGE SIZE	_____	
	IMAGE QUALITY	_____	
	DYNAMIC RANGE*	_____	
	ND FILTER	_____	
	CORRECTED AF FRAME	_____	
	FLASH MODE	_____	
	FLASH COMPENSATION	_____	
	SELECT CUSTOM SETTING	_____	
	FACE DETECTION	_____	
	PREVIEW PIC. EFFECT* ?	_____	
	HIGH PERFORMANCE		
	RAW		
	CONVERSION LENS		
	SHUTTER TYPE		
	NONE		