Panasonic Lumix
DMC-FZ200

User's Manual

by Graham Houghton

All illustrations for this book were photographed using the Panasonic Lumix GH3 with 12-35mm F2.8 X series lens.

All other examples of image effects etc., were photographed using the Panasonic Lumix FZ200.

The reference to any manufacturer's product is done purely to illustrate an example and does not imply that I endorse, or have been sponsored by them to promote the product!

The opinions expressed within this booklet are my own and derived through extensive use with this camera. There may be some areas that may contain references which may generate some discussion however I hope that these don't detract from the overall aim of the book which is to offer sensible reference material for this camera.

All images are from my own FZ200 library (except where stated otherwise) and used to illustrate particular functions or settings etc.

All Feedback Welcomed on support@grahamhoughton.com

Acknowledgements

This eBook is dedicated to all my friends and subscribers on YouTube® who have given me great feedback on the video tutorials that I have produced for this camera, and many others. Your encouragement and constructive comments have helped to develop the idea to create this book and other tutorial material. A special thanks to those who helped to preview, submitted typos and gave guidance in the format of the book.

About The Author

With more than 40 years experience in the photographic industry, teaching photography at a local adult education college and as a product specialist and European trainer with Kodak Limited I have been fortunate to learn many aspects of photography and photographic science.
I have been passionate about my own photography for many years striving always to achieve the highest standards at photographic club level and with my own private images.

I have evolved with this as a hobby, developing my own black and white and transparency material and then migrating to digital photography as the first of the digital cameras were commercially available. I was fortunate to see the first hybrid camera with the Eastman Kodak sensor in a Nikon F3 body, the Kodak DCS100 digital professional camera with a massive 1.3 mega-pixel KAF1300 sensor. This camera had a CCD back where the traditional film plane would be and a tethering cable to a display and digital storage unit. How technology has developed since 1991.

By way of my YouTube® channel www.youtube.com/user/ghough12 and this book I hope to be to pass on some of this information and hopefully encourage others to take more rewarding images with their FZ200 camera.

Graham Houghton , Manchester,
December 2013

Preface

You don't really want excellent pictures from your Panasonic Lumix FZ200 – you *demand outstanding pictures*, after all your Panasonic Lumix FZ200 is one of the most advanced digital bridge cameras that Panasonic have produced.

The Panasonic Lumix FZ200 boasts many features like the 12.1 mega-pixel MOS high sensitivity sensor, the constant f2.8 aperture 25mm – 600mm (35mm equivalent) lens and 12 frames per second shooting mode. The Panasonic Lumix FZ200 has enough customisable features to satisfy the most avid of amateur photographers. This fantastic piece of optomechatronics is only let down by the abysmal documentation that comes with the camera in the form of the basic user's manual or the advanced guide found on the accompanying CD-ROM.

You know what you want to find out is in there, however it is so hard to find and you don't know where to start. Furthermore the "official" manual doesn't offer very much information regarding the basics of digital photography or photography in general.

This is where this guide book about the Panasonic Lumix FZ200 will help. It explains the purpose of each of the Panasonic Lumix FZ200 functions and controls, how you should use them and, more importantly, why.

From the start there should be some information regarding the file formats, aspect ratios, image size, the priority shooting and autofocus modes. Many like to dash out with their new camera and shoot off a few hundred pictures and then come back at a later date to review these things. So why isn't there a section in the official manual which summarises this important, foundational, knowledge in its opening chapters and presenting lots of illustrations showing what your results will look like when you alter each of these settings?

So if you can't understand what basic settings to set up your camera with, because you don't understand, for example, how changing ISO or focus default method will affect your images, then you need this guide.

I don't assume any superior knowledge and won't talk down to you, either. This guide isn't packed with pages and pages of check lists on how to take travel picture, wedding pictures, sports pictures etc., but will endeavour to give you the information that you will need to take great images on your own!

Table of Contents

Chapter 1

Introduction

Congratulations Panasonic you have done it again! You have packaged some of the most technologically advanced features into a bridge camera and brought easy image capture which will satisfy all but the most discerning of serious amateurs in the consumer market place. It provides a superb entry into digital photography for those who want to transition from traditional film based cameras and for those users who may perhaps have a compact digital camera but would wish to get a little bit more creative in their digital image making. The Panasonic Lumix FZ200 isn't a snapshot camera – it's a serious point and shoot (if you prefer to leave the camera in the iA mode) device for the photographer who wants to do more.

Now you have purchased this wonderful piece of technology and marvelled at all those switches and buttons and deeply nested menus the inevitable question will arise in your mind, *how do I use this thing?* All these great features can be overwhelming and seem impossible to remember, especially if you don't use the camera frequently.

Fear not, help is on its way in the form of this guide book. I really believe that this guide will be your best resource for learning all of the Panasonic Lumix FZ200 features and how to embrace digital photography to the full.

I know I've produced a whole set of tutorials based upon the Panasonic Lumix FZ200 which are freely available on my YouTube® video channel www.youtube.com/user/ghough12 and produced a number of "hints and tips cards" which are also freely available on my photoblog site at

http://www.grahamhoughton.com/download-section/

However the most successful way to learn about photography with the Panasonic Lumix FZ200 is to go out and take pictures with your camera based upon the information you will learn in this guide.

All the technical information is available within the advanced manual supplied with the camera on the CD-ROM but what it lacks is the "*what settings you should be using in different situations*".

I've tried to make this book more organised and through large, detailed, color images show you where all the buttons and dials are and the accompanying explanations as to what they do. I've purposely avoided giving detailed information on how to take specific types of images such as "travel pictures", "sports pictures". Instead I have tried to concentrate on giving you the tips and techniques for using the features of the Panasonic Lumix FZ200 to take *any kind of image* you want.

If you are looking for specific instructions on how to take a particular type of picture of say a racing car hurtling down the pit straights then there are literally tens of books out there which will teach you just that. This guide will concentrate on teaching you how to select the best ISO, autofocus mode, shutter speed, aperture to take an image of any sports in any lighting conditions.

This guide is not just a technical rewrite of the *advanced user manual* that came with the camera on the CD-ROM. I know some people will just spend a few minutes browsing through this guide and see maybe some similarity of the entries and decry it as such without really understanding the differences. Yes you will see similar entries as in the *advanced user manual* but these will be the generic, or basic, instructions for entering menus etc. After all there are not many ways of expressing for example "hold down the shutter button half way to lock the focus and exposure".

This guide is truly aimed at Panasonic Bridge camera veterans who have upgraded their camera and also to complete newcomers to digital photography. Both of these can be overwhelmed by the sheer complexity the Panasonic Lumix FZ200 can offer, yet underwhelmed by the total lack of instructions contained within the user manuals.

About You the Reader

Whilst I was in the process of putting this guidebook together I tried to consider exactly who would be benefiting from its contents. Indeed I made repeated visits to the comments section of the featured videos on my YouTube® channel to see the sort of questions being asked. It is by reviewing those which led me to the style and format of this guide book.

From a skills level you may fall broadly into one of the following categories:

►A professional photographer who already knows all the photographic science needed to take great pictures and simply wants to use the Panasonic Lumix FZ200 as a simple "out and about" camera without the need to carry a huge bag of lenses needed to fulfil his or her needs.

►Individuals who want to get better images than can be afforded from just basic compact digital cameras.

►Those who want to strive to get better, professional looking images for their business or website and feel the Panasonic Lumix FZ200 will give them that facility.

►Corporate workers who may want to produce higher quality images for inclusion in some of their company presentations, reports or other applications.

Considering the very different skills levels was a more difficult decision as the Panasonic Lumix FZ200 is such a fantastic camera that it covers a huge spectrum of potential people who will buy and use it, from absolute beginners who have never owned a digital camera before to the professional with years of shooting experience who may be using the Panasonic Lumix FZ200 as a backup camera.

I decided it was a pretty tough assignment to provide something for everybody, so I will be trying to cover the needs of each of the following groups and their skill levels:

►**Complete beginners to digital photography**: if you have only used the basic of compact cameras, or have worked only with film based cameras in the past then you are to be congratulated on the choice of camera you have made. This guide to the Panasonic Lumix FZ200 will

help you to understand the controls and features that this camera provides and help you to progress into digital photography with the minimum of concerns. If you really get hooked then you may find that additional research into some of the topics that I will explore will help speed this journey.

►A**dvanced point and shooter who is upgrading**: There are many technically well specified cameras out there in the market place. Panasonic has an extensive range of models to suit consumer lifestyles. Models like the LX series and TZ (ZS) series do have many user definable options and settings and it is quite possible you have a lot of technical expertise with these cameras. You may have recognised some of the inherent problems associated with this class of camera like slow autofocus or shutter lag and sometimes the restricted aperture or zoom range available on them. The possibility of using more powerful, external flash units, external microphones to record better sound for your video clips and simple things like the facility to employ filters to modify the light entering the camera or provide creative effects may be another reason you have decided to purchase the Panasonic Lumix FZ200.

►**Traditional Silver halide (film emulsion) users new to the digital era**: You probably know all about photography, you understand f-stops, shutter speed and ISO which make up the components of the "exposure triangle". You may even have had one of the more sophisticated film cameras which also employ some pretty slick electronics like autofocus and metering modes. All you really need is the relevant information on using the digital specific features of the Panasonic Lumix FZ200 and how to match, or exceed the capabilities of your previous film based camera.

►**Professional Users**: I expect you to be the most discerning readers who have already extensive working knowledge of digital photography and the associated digital work flow. I cannot teach you much more about digital photography but hopefully allow you to experience the joys of shooting digital images with the Panasonic Lumix FZ200. You might feel like I do that the Panasonic Lumix FZ200 will provide a tool to capture great images in a variety of situations without the added hassle of a DSLR and lens systems providing you with a very quick, lightweight and feature rich machine to do it with.

Getting Started with the Panasonic Lumix FZ200

Panasonic's Lumix FZ200 provides a reward winning entry into the rapidly growing bridge camera market. This remarkable camera possesses many of the same attributes of the much bigger and bulkier DSLR cameras yet maintains some of the advantages of the smaller and lightweight compact cameras. Go out and try it. Just insert a SDHC memory card and a charged lithium-ion battery into the respective compartments in the base of the camera and switch it on by turning the power switch (located to the bottom right of the top mode dial)

Slide to switch on the power and in less than 1 second the camera is ready!

The green power LED illuminates and the lens extends, now turn the control dial so that the red iA position is opposite the index mark.
The Panasonic Lumix FZ200 is now awaiting you! Point the camera at an interesting subject and press the shutter release button and hey the camera returns a pretty good image on the back of the camera LCD. Wasn't that easy!

The chances are though you're probably not going to be happy with the pretty good images this camera can deliver. You will want to shoot *fantastic* images.

The Panasonic Lumix FZ200 can do that too. All you need is this guide book and a little practice.

The first step is to familiarise yourself with the camera, the first three chapters of this guide will ensure you will do that. As you gain more experience and new skills you'll be eager to know how to improve your exposures, fine tune the color balance and use some of the essential tools of photography such as using the pop up electronic flash correctly and how to use the camera in a wide range of photographic lighting conditions. The Panasonic Lumix FZ200 is not only very easy to use, it's also easy to *learn* to use as long as you have my little guide book to help you along the way!

In this guide book the first section will cover what you absolutely *need* to know just to get started using the camera and you will find this information in the rest of this chapter.

Secondly I will take a more in depth look at what you *should* know about the camera and its associated controls to use its features effectively. Finally you will learn how to make key settings using the menu system, so you will be able to fine tune the Panasonic Lumix FZ200 to operate exactly as you want it to do for your style of photography (or make multiple set ups easily accessible from the mode dial via the C1 and C2 settings).

Whilst you will probably master most things in the first two chapters, you can take more time to explore the possibilities described in the third chapter – mainly because you won't need to use them straight away. I've included all the menu structure here in one place so you will find what you need, when you need it, and all in one place.

Some of you may have had previous FZ cameras, so if you fall into this category you will be able to skip through these chapters more quickly and move onto the two which follow.

The following few pages are designed to get you up and running with the camera as quickly as possible. If you are completely new to digital photography or digital cameras, you may want to read through this section more slowly and have the camera by your side in order to "follow along" with the instructions given.

After all the Panasonic Lumix FZ200 is not a point and shoot camera, though you can easily set it up to be one using the fully automatic iA mode or by using the semi-automatic Program exposure mode (P mode) and using just a basic autofocus mode and autofocus style.

However if you want more control over your shooting you will need to understand more. I'm just going to tell you here what you *absolutely* must know and understand to get fully proficient with your Panasonic Lumix FZ200.

I'll go into more depth in later chapters and even repeat some of the earlier chapter information so you don't have to remember absolutely everything that you see written down here. So just pick up your camera, follow a few easy steps and then go out and begin to take your best shots – ever.

Let's begin the journey into your quest for more knowledge with a look at the Panasonic Lumix FZ200 in some detail. I'm not going to replicate what is already in the basic user guide with a complete breakdown of what's inside the box and how to attach the camera strap. I'm sure you just want to know how to use it, right?

The Panasonic Lumix FZ200

The first area of this remarkable camera is to look at the recording media options and some hints and tips on battery charging to extend the number of shots you can get from it.

Typical SDHC cards which can be used with the camera

Although the Panasonic Lumix FZ200 has a built in 70MB of memory this is hardly sufficient for everyday shooting and does not allow you to use the full potential of the video capabilities of the Panasonic Lumix FZ200.

Memory Cards

Let's begin by taking a look at what you will need to consider when purchasing additional memory cards.

The memory card that the Panasonic Lumix FZ200 utilises is referred to as the SD standard. This "secure digital" card format is an industry standard in terms of size and shape but unfortunately the way in which the memory "write" speeds are disclosed, leaves some room for improvement and causes a great deal of confusion with buyers. Often cards are purchased on the advice of camera shop sales persons who, in many cases, do not understand this system either!

Let me break this down as simply as I can to prevent you making expensive buying mistakes with future purchases.

Basically the SD format card is available in two packages, one is the first generation card and referred to as SD and is generally available in capacities of 8MB to 2GB. Although these cards can be used I would persuade you not to use them as they usually have a slower "write" time and with video recording limit, the time you have available considerably. It is better to start your collection of addition memory with the second generation of card the SDHC (secure digital high capacity). You can tell the difference by the logo on the card

The capacity of these new cards extends from 4GB to 32GB and there are several pros and cons for selecting either a lower capacity or higher capacity card. If you are shooting video it makes sense to utilise the higher capacities as this gives you the most benefits of having all the days' clips on one storage card. If you are shooting stills, with perhaps just a few minutes of video clips mixed in, then it

A sdhc card

may be more cost advantageous to purchase either 8GB or 16GB cards. Using this approach also limits the loss of images if for some reason a memory card gets corrupted or fails totally. I generally use 16GB cards for this reason. If you have real demand for video clip storage or plan on doing an extensive photo shoot with both RAW and JPEG files then you do have the option to utilise the latest generation of these cards the SDXC (secure digital extended capacity).

These are available in capacities from 32GB to 2TB (maximum capacity, up to 128GB available at the moment). However the Panasonic website recommends cards up to 64GB only for use in the Panasonic Lumix FZ200.

These new generation cards have a lot more technological advantages for serious amateur or professional customers, they have a much longer data archival life (claimed up to 10 times longer than SDHC), they incorporate power failure protection which help to safeguard data loss and they have an intelligent data write controller which varies the sections of memory used within the card to prevent premature failure through constantly writing to the same blocks of memory. In addition the new cards use an advanced MLC (multi level cell) technology which increases the data write rate, can withstand

A SDXC card

higher and lower operating temperatures and ambient magnetic and static electricity fields and also things like x-ray machines and are also more resilient to physical shock. These features come at a premium price however if your business requires protection against image loss then this investment is really worthwhile. For general use there is no real reason to choose SDXC over SDHC, better to have a few higher capacity SDHC cards in my opinion.

The other consideration apart from capacity is the speed at which the card will write data to the memory structure. Universal standards use the *CLASS* system. The higher the class number the higher the data rate the card will achieve.

Panasonic specifies a memory card with a minimum class rating of 4 for use with the Panasonic Lumix FZ200 if you intend to shoot video. If you are primarily interested in shooting still images with this camera then you may consider less expensive class 2 cards but the saving is very minimal.

My recommendation is to use at least class 6 to ensure you have more data writing speed capacity as some cards do write slower than claimed on the label!

A class 6 sdhc card

A new card is normally pre-formatted with FAT32 but does not have the file structure the Panasonic Lumix FZ200 uses. When you take your first shot with the new card the camera creates the necessary file structure for you. Formatting in the camera is preferable to formatting in a PC as this erases the whole card and creates the required file structure. We will look at these directory structures later in the book but for now you have the basic knowledge about them.

Finally a word about a suggested work flow with your SDHC cards to prevent you overwriting cards that you have used previously without copying the data from them to your computer

The write protect switch

When a card is full and you remove it from the camera slide the write protect switch down (*often labelled lock*) as this has the two fold benefit of write protecting your data should you inadvertently put the card back into the camera and secondly signifies that you have still to

sdhc write protection

transfer the data from this card to your computer. Once you have done this you can slide the switch back to the unlocked position. There are various methods of card storage available and I prefer to keep the cards in a small metal holder which has foam cut outs for the cards, this affords maximum protection and is large enough that it can be located easily in the camera bag.

Lithium-ion Battery Care

The lithium-ion battery used with the Panasonic Lumix FZ200 is the (DMW-BLC12E), 7.2v 1200mAH battery. It comes with a mains (outlet) charger unit (DE-A80A) and, if needed, the appropriate power cord for the country of use. Also available are third party chargers with the additional facility of being able to charge the battery from an automotive power socket, a feature which I use continuously and wonder why Panasonic do not implement this feature on their chargers.

The battery is equipped with short circuit and overload protection and integrated circuits which are used to monitor the battery power level and can communicate this with the camera to give you an accurate battery remaining percentage indicator.

You may have noticed that Panasonic have gone to great lengths to warn you about the use of counterfeit or third party batteries because of the risk of fire or explosion within the camera and have introduced a method of establishing if the inserted battery has the Panasonic safety check mechanism warning you that "*this battery cannot be used*" if a non-approved battery is inserted. It didn't take long for the third party manufacturers to crack this code and offer fully compatible batteries for the Panasonic Lumix FZ200.

Whether you use them or not is a decision that you will make alone, but given the attractive price of these substitutes and the level of risk involved I am sure a lot of you have used these batteries without incident. I am not advocating use either way, just be aware of the potential consequences.

The battery itself comes only partially charged and requires a full charging cycle to prepare it for use. Insert the battery in the charger unit and plug the charger into the mains (or 12v power outlet in your vehicle if using a third party charger with this facility). The green charging led will illuminate and the battery will commence the charging process. It is recommended to charge the battery at temperature of between 10 and 30 degrees Centigrade (50 to 86 Fahrenheit). Once the battery has completed the charge cycle the led will go out.

(Tip: if you allow the battery to cool for about 30 minutes and put it back on charge you will get an extra few minutes of power as the charge is temperature dependant)

If there is a problem with the battery the led will blink continuously. This could be due to the fact that the battery temperature may be too high or too cold to charge. Battery charging from completely exhausted can take up to 140 minutes.

Although lithium-ion batteries do not suffer any "memory effect" if charging is done from partially exhausted batteries, it is recommended to allow the battery to have a complete discharge/charge cycle to keep the battery condition optimal. Frequent, top up charges, has been cited as bad for the battery formulation.

Again for safety reasons it is best to keep spare batteries in the protective case in which they are supplied to prevent short circuit on metal objects in your pocket, or camera bag with the risk of fire or explosion.

During continuous use the battery (and the camera) might become quite warm however this is normal and should not be considered as a malfunction. (*Unless the battery is so hot to touch that it causes personal injury then the battery may be showing signs of failure*).

As the battery is used and goes through discharge/charge cycles, the battery will eventually lose its full capacity and the recording time or number of shots will begin to diminish.

The "official" data for the recording time or pictures being able to be shot is quoted to be 540 pictures or 270 minutes of recording in controlled conditions and is only meant as a comparison guide between models. Realistically the number of shots and recording time will be much lower however this will be influenced by a host of factors like zoom used or flash enabled etc., so be prepared!
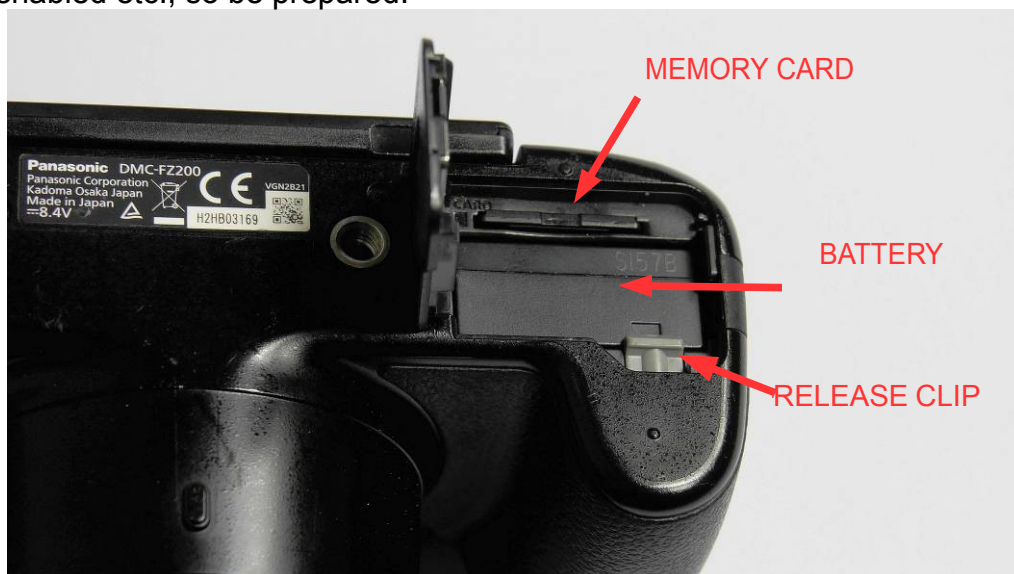
The Battery and memory card compartment

The battery will only insert correctly one way, with the small notch on the battery base being aligned to the release clip. The memory card is inserted contacts first and the logo facing the front of the camera. To release the memory card from the camera, press down on the card.

It is recommended not to release the memory card whilst the camera is powered on and especially if the camera is still writing data to the card (as indicated by the red write to card symbol on the LCD screen) as data will be lost and there is the potential to damage the camera and/or memory card.

There is a small residual current used by the camera, even with the power switch in the off position, after an extended period of non use the battery may become exhausted through the process of self discharge and this residual current. It is recommended that if you will not be using the camera for a month or so to remove the battery completely from the camera. Again good practice would be to store it in its protective plastic case.

Fitting the Lens Hood

Fitting the lens hood on the Panasonic Lumix FZ200 is essential.
It helps to prevent damage to the front element of the lens but, more importantly, it helps to reduce flare from light which may otherwise fall directly onto the front surface of the lens.
This flare is more noticeable with bright light sources like the sun and can produce quite obvious colored streaks on your images. This flare also reduces the contrast of your images and, if the lens isn't perfectly clean you will see much more dust artefacts on your images as well – especially on wide angle shots where the lens can focus right down to a few centimetres.
The hood is fitted to a circular groove on the front of the lens and is installed with the index mark on the lens hood rear flange positioned at around 10 o'clock and then turned clockwise until the lens hood "clicks" in place – a new hood will be quite stiff but it will locate correctly with firm pressure (a little furniture polish on the hood tracks will help). *It is best to do this with the power off to prevent damage to the zoom motor.*
At this point the index mark will be at the 12 o'clock position.

When you want to store your camera in a camera bag leave the hood in place. If you need to remove the hood turn it anticlockwise to disengage it from the fixing ring.
The hood can then be reversed and fitted to the lens. Position one of the smaller petal shaped parts of the hood at the 12 o'clock position and rotate the hood clockwise. It will click again this time and the hood will be attached securely. The lens cap can then be placed over the lens to protect it.

The lens hood correctly installed onto the front of the lens.
Note the index mark is at the 12 o'clock position.

A video showing this procedure: https://www.youtube.com/watch?v=-uozw-_KvDs

Memory Card Capacity

For Stills Photography
– using JPEG only, RAW considerably less

Image Size	In Camera	2GB	32GB	64GB
12M	13	380	6260	12670

Table 1: Memory card capacity based on the Maximum File size 4:3 aspect ratio 12M pixel

For Videography

AVCHD	In Camera	2GB	32GB	64GB
PS		~8 mins	~2 Hrs 30 mins	~5 Hrs 7 mins
H		~14 mins	~4 Hrs 10 mins	~8 Hrs 26 mins
FS		~14 mins	~4 Hrs 10 mins	~8 Hrs 26 mins

Table 2: Recording Time based upon AVCHD Format

PSH is 1920 x 1080 50 (PAL) 60 (NTSC) frames per second progressive recording at the highest possible variable bit rate @ 28Mbps

FSH is 1920 x 1080 50 (PAL) 60 (NTSC) frames per second interlaced recording @ 17mbps

SH is 1280 x 720 25 (PAL) 30 (NTSC) frames per second progressive recording @ 17Mbps

AVCHD Format Specifications

AVCHD is an HD video format that uses Advanced Video Coding (AVC) compression (also known as MPEG-4 part 10 or H.264).

Video Standard

The AVCHD specification was jointly developed by Sony and Panasonic. AVCHD allows for HD recording (1080i, 1080p, and 720p) and SD recording (480i and 576i).

Aspect Ratio

AVCHD records HD video with an aspect ratio of 16:9. SD video can be recorded with either a 4:3 or 16:9 aspect ratios.

Frame Dimensions, Number of Lines, and Resolution

AVCHD supports three HD video resolutions:

1920 x 1080: This format is sometimes called Full HD because it contains the full 1920 horizontal pixels of the 1080-line HD format.
1440 x 1080: This is a horizontally sub-sampled image with 1080 lines.
1280 x 720: This is a full-resolution 720p format.
SD NTSC and PAL compatible formats are also defined in the AVCHD specification: 720 x 480 at 60i
720 x 576 at 50i

Frame Rate

The specified AVCHD frame rates are:

NTSC compatible frame rate: 29.97 fps (1080i60, 720p60) PAL compatible frame rate: 25 fps (1080i50, 720p50)   Film compatible frame rate: 23.98 fps (1080p24, 720p24)

Scanning Method

AVCHD can record either interlaced or progressive scan images: 1080 lines: Interlaced (1080i) or progressive (1080p)
720 lines: Progressive

Color Recording Method

The AVCHD color sample ratio is 4:2:0, with 8 bits per sample.
This means basically the camera uses more brightness information than
color. The human eye is far more sensitive to changes in light than color.
To save file size color is encoded at a reduced level and de-coded during
replay or editing to restore the original color hue.

Data Rate

The amount of storage space required by AVCHD footage depends on
the quality setting chosen on the camcorder. Most camcorders support
several quality levels, although these quality levels have different names
and bit rates on different camcorders. When variable bit rate (VBR)
encoding is used, complex and rapidly changing video requires more
data, shortening recording time. Therefore, stated variable bit rates are
an average.

MP4	In Camera	2GB	32GB	64GB
FHD		~12 mins	~3 Hrs 23 mins	~6 Hrs 50 min
HD		~23 mins	~6 Hrs 28 mins	~13 Hrs 4 min
VG	~1 min 30 sec	~50 mins	~4 Hrs 00 mins	~28 Hrs 4 min

Table 3: Recording Time using MP4 Format

FHD is 1920 x 1080 25 (PAL) 30 (NTSC) frames per second

HD is 1280 x 720 25 (PAL) 30 (NTSC) frames per second

VGA is 640 x 480 25 (PAL) 30 (NTSC) frames per second

In addition the camera can shoot, in VGA mode 200 fps without audio and
100 fps in 1280 x 720 mode without audio (240 and 120 fps NTSC)

The above information regarding the two video/audio encoding codecs is
for information only and it is not essential to know at this stage but I
thought it worthwhile including it here for those with an insatiable thirst for
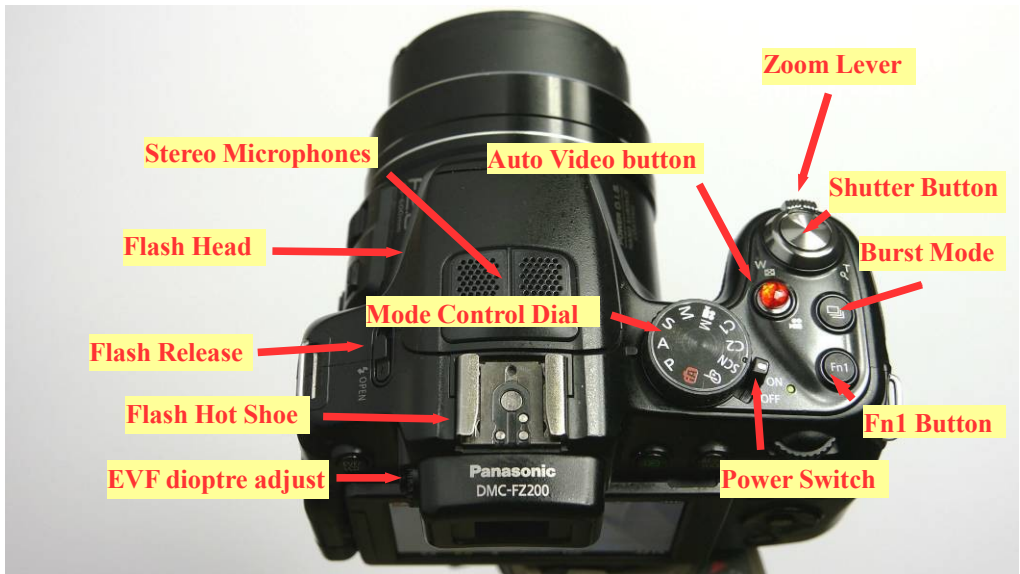more in depth knowledge!

Camera Tour

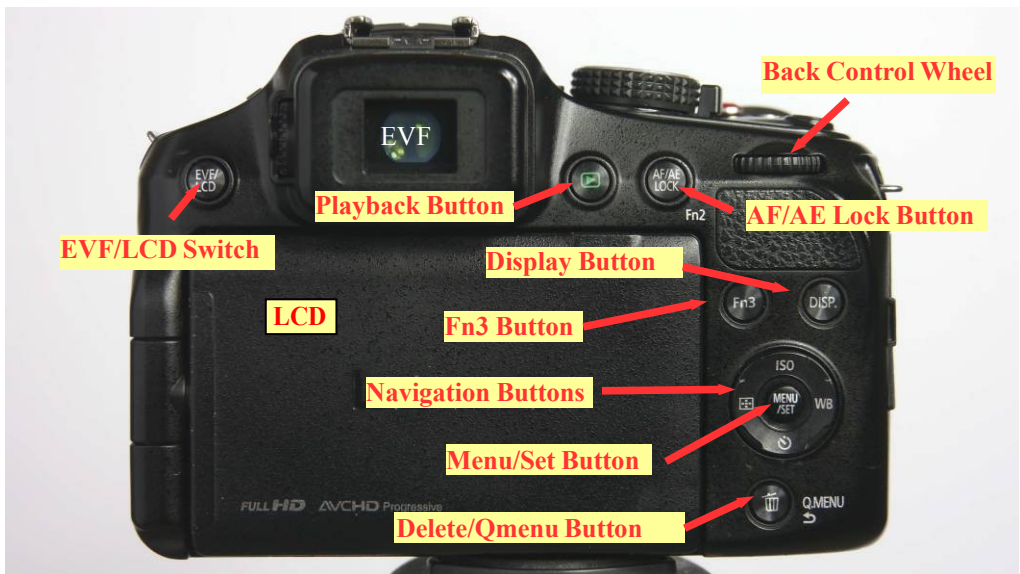A guide to the most commonly used controls and features of the Panasonic Lumix FZ200.

The Panasonic Lumix Front Elevation

Side view

Top view

Rear view

Description of Controls and Switches

Top of camera

Power switch - turns the camera power on or off.

Mode Dial - by means of this dial you can preselect a shooting mode and determine the amount of control over the automatic function that you have, just turn the dial until the shooting mode you require aligns with the index mark.

EVF Dioptre adjustment - by use of this small ratchet wheel you can adjust for your own eyesight correction level, adjust this wheel until, as you look into the EVF, the menu or grid lines appear sharply focused, do not try to set the focus on the displayed image.

Flash release lever - use this lever to allow the flash head to pop up and turn on the flash electronics.

Auto Video record button - this button starts video recording in fully automatic mode. It uses the settings you have set up in the video recording set up menu (AVCHD or MP4 and recording quality).

Burst Mode button - use this button to select the burst mode rate, depending upon if you want the autofocus enabled for each shot, or for the focus to be set on taking the first image only.

Zoom lever - this lever is used to operate the zoom lens, it has two positions. The first position which operates as you slightly rotate the lever is for the slowest zoom rate and the full rotation of the lever allows the lens to travel at its fastest zoom rate. Pushing the lever anti-clockwise drives the zoom lens to the wide angle setting whilst rotating the lever clockwise drives the zoom lens to the telephoto settings.

Shutter release button - is used to take the exposure. It has two defined positions. Half way depressed enables the focus and metering systems to establish both the focus and exposure and the fully depressed position initiates the final exposure sequence. During a self timer mode the full depression of the button begins the timer sequence. In burst mode shooting pressing and holding down the button initiates this sequence.

Fn1 Button - is a user defined button and it can be set up to access a range of commonly used functions which will speed up access to the feature which has been assigned in the menu.

Flash Hot Shoe - allows the use of external flash guns, or flash triggers to be used for creative flash photography or this shoe can be used for holding accessories such as a microphone or video light.

Stereo Microphones - these two microphone ports allow the camera to record audio during video recording operation. Wind cut and zoom mic functions can be defined in the set up menu.

Front/sides of camera

Focus assist/self timer indicator LED - this led functions (if enabled in the menu) to allow a high intensity orange beam to illuminate the subject to assist the focus system to determine the increased contrast subject's focus distance. In the 2 second timer mode this LED blinks at 0.5 second intervals during the delay time before exposure takes place. During the 10 second self timer mode it blinks at a 1 second rate for the first 8 seconds then blinks at the 0.5 second rate for the remaining 2 seconds.

Zoom side lever performs exactly as the top zoom lever does however it is possible to program, from the set up menu, this lever to operate as a manual focus lever instead of providing the zoom functionality.

AF/AF Macro/MF switch - this switch allows the minimum focus distance to be set for the telephoto zoom position. At the AF position the camera is quicker to acquire focus as it does not have to cycle through the minimum focus distance. As a result the closest focus distance is 2 metres (6ft 6inches). When the switch is set to the AF macro mode (mid position) the camera uses the whole focus range which is down to 1 metre (3ft 3 inches) at the full telephoto setting. In the MF position the focus of the lens is controlled manually by the navigation buttons, the back control wheel or the zoom lever - if it has been programmed to manual focus operation.

Lens controls

Focus button - this button is used to acquire automatic focus whilst in manual focus mode and to initiate the setting of the focus target size and position in autofocus modes.

Microphone/Remote release port - behind the rubber dust seal is a 2.5mm socket. This port is a dual function device allowing an external microphone (like the Panasonic MS-1) or any other electret condenser microphone with a 3.5mm female to 2.5mm male stereo adaptor cable to be used. It can also be used for connection of a wired remote shutter release switch or intervalometer to do time lapse photography, for example. The port can only be used for one function at a time.

HDMI and AV port on the left hand side of the camera (viewed from the front) behind the large dust seal flap are 2 ports. The largest is a mini HDMI socket for connection of the camera to an external display or TV set and the smaller port provides a lower quality, composite video plus left and right audio signals.

Back of camera

EVF/LCD button - provides the facility to switch the display from the LCD screen to the EVF (electronic view finder) and vice versa.

Replay button - switches the camera from the recording mode to playback mode allowing the last image or video clip to be reviewed on the LCD screen.

AF/AE Lock button - this button is used to provide exposure, focus or both exposure and focus lock depending upon how this button is assigned in the set up menu.

Depressing this button with the camera aimed with the focus square aligned on the subject will cause the camera to evaluate and lock the focus or exposure or both.

This locked exposure and focus will remain in place until the button is again depressed or the camera is turned off. The button can also be assigned as the Fn2 button if the AE/AF lock facility is not needed and then another function could be accessed by depressing this button.

Fn3 Button - gives access to a user programmed function which will be explained later.

Disp Button - allows the method by which screen information is presented to you.

By depressing this button it is possible to cycle through the display options available to change the level of detail shown.

4 Way navigation button - provides access to navigating up and down through the menus and also the pre-set functions of ISO control (top) Self-timer (bottom), White balance (right) and AF mode (left).

Menu/Set button - this button is used as the method to enter the menu system and also to provide the "setting" of a function or parameter in a menu.

4 way control

Qmenu/Return/Trash - this button is used to exit from the menu system or the access to a method of getting to the commonly used menu items, or, if the camera is in the playback review mode, the facility to delete the video clip or still image which is currently being displayed.

Rear control wheel - this wheel has both rotate and inward press functionality. Depending upon the current camera mode it can be used to select aperture or shutter or select menu items. Pressing inward acts like another control button for certain functions to be explained later.

LCD Display - this 3 inch, 460,000 pixel display is the main user interface for viewing the camera menus, shooting information and the scene being recorded in a video recording mode.

It also allows the preview of images just acquired and

Articulated display screen

those already captured and stored on the memory card. It can hinge out by 180 degrees and pivot 270 degrees in a vertical plane to allow very low or high angle shots to be taken as well as viewing the screen for self portraits etc.

EVF Display - this 0.21 inch display with a resolution of 1,312,000 pixels provides a bright 100% field of view as an alternative to using the rear LCD.
This is particularly useful in shooting in bright sunshine.

Electronic view finder

It is also helpful in achieving greater camera stability as the extra point of contact with the head offers more stability for hand held shots. It has an adjustment for user eyesight correction to allow fine focus to be achieved on this high resolution, high refresh rate monitor.

Mode Control Dial

The mode control dial is the key to setting the Panasonic Lumix FZ200 to giving you the control you desire to create great images.

By selecting iA (intelligent Auto) mode you can begin shooting while the camera makes all the judgments regarding exposure and focus, based upon a very complex set of algorithms analysing the density distribution and color of the pixels being recorded by the camera sensor.

Mode control dial

Other settings on the mode dial allow you to take full control or some control of the picture taking process.

Some Things You Should Understand

As with any camera system there are some technical aspects that need to be completely understood in order that you can get the best image quality from the Panasonic Lumix FZ200. I want to introduce a couple of them now before we take a closer look at some of the operating modes of the camera.

Aspect ratio

This is an important one to consider as it will affect the final look of your captured image.
You should always consider how the image will be used. For example, will it be displayed on a HD TV, used as a still photo in a HD video, or used to produce a paper print, or to display in a digital photo frame or just used in a web or social networking site?

Aspect ratio is the relationship between the width and height of the recorded image.

The Panasonic Lumix FZ200 supports four aspect ratios;

Square format 1:1

HD format 16:9

35mm format 3:2

Rectangular 4:3

Choosing the right format will depend on the primary intended use of the image. If for example you set an aspect ratio of 3:2 then this is ideally suited to photographic prints such as the most popular print size of 6 x 4 inch (152 x 102 mm).

However using this aspect ratio will mean that the other popular print formats of 7 x 5 inch (178 x 127 mm), 8 x 6 inch (203 x 152 mm) and 10 x 8 inch (254 x 203 mm) will require that the image be cropped to fit into these frame sizes.

If you choose to shoot with the 4:3 aspect ratio then you will have an image which corresponds to the new international print size of 6 x 4.5 inch (150 x 114 mm) or the 8 x 6 inch (203 x 152 mm) print size.
All other sizes will again requiring some image cropping to fit the standard frames

Here is a chart of popular print sizes and pixels required to print (at 300 dpi)

Size inch	Size mm	pixels	Aspect ratio
5 x 3.5	127 x 89	1500 x 1050	10:7
6 x 4	152 x 102	1800 x 1200	3:2
6 x 4.5	152 x 114	1800 x 1350	4:3
7 x 5	178 x 127	2100 x 1500	7:5
8 x 6	203 x 152	2400 x 1800	4:3
10 x 8	254 x 203	3000 x 2400	5:4
12 x 10	305 x 254	3600 x 3000	6:5

With the rapid growth of HDTV which has the wide screen 16:9 format a lot more consumer products have adopted this display format such as laptop and tablet PCs, mobile phones and digital print frames. If you are shooting images that will be displayed on any of these devices it makes perfect sense to shoot in the 16:9 HD aspect ratio as what you see on the rear LCD screen of the camera is what you will see on this viewing platform. There will be no image cropping.

If you were to display any of the other format images on the HD platform you will notice that there will be some image border. Most TV systems will scale the picture to fit the height so you will have grey or black side borders and if you are making a HD video using these non 16:9 aspect ratio images you will again have side borders unless you crop into the image to fill the width of the frame.

1:1 aspect

3:2 aspect ratio

4:3 aspect ratio

16:9 aspect ratio

4:3 image in HD video

3:2 image in HD video

16:9 format still in HD video

Sample Images at the 4 Aspect Ratios

Note how in the HD movie stills the 4:3 image fills more of the frame, in some situations this grey (or black) border may be acceptable depending upon the context of the video. In most cases though it might be better to crop this image to fill the frame and lose this distraction.

Image Size, is also important to consider when we are setting up the camera, as with aspect ratio, it will affect how the image is displayed, or printed. For printing it is generally accepted that a pixel density of at least 300 pixels per inch is required to produce a good print from modern ink jet printers. For screen presentation this pixel density can be reduced to 70 pixels per inch. In printer language this pixel density is usually termed DPI (or dots per inch) however it is the same as pixel density.

So when choosing the image size, in the menu of the recording set up screen, you can elect to always shoot at the highest image quality knowing that you can always "crop" into such an image to allow for fitting to a print size which doesn't correspond to either a 4:3 or 3:2 aspect ratio. If the images are for just inclusion on social media or web pages, for example in a personal blog, then you can save upload time if you choose a smaller image size. Similarly for stills which will be used in HD video productions the 2M image size has enough pixels to

meet the 1920 x 1080 pixel requirement. I normally shoot always at the highest image size as this allows more options for cropping or doing, for example a picture zoom within a video clip.

Image Quality - this is the camera setting which allows the image to be written to a file on the memory card in either a RAW and/or JPEG format. A RAW file is basically the unprocessed sensor data written to the image file. This format requires an external program to "process" this file into either a JPEG or TIFF format.

(*JPEG = Joint Photographic Experts Group and TIFF = Tagged Image File Format*)

Silkypix® is supplied with the camera on your software CDROM to allow experienced users to "develop" the RAW file allowing them to achieve a higher image quality than that which can be obtained by the camera processed JPEG images.

With such fine control over the white balance, contrast, saturation, noise reduction and sharpening it is worth considering this option if you want to produce images of the highest quality, especially for larger print sizes. It allows for the production of 16 bit TIFF files which have a lot more tonal gradation than that which can be achieved using the 8 bit JPEG files.

If you choose only to shoot in the JPEG format you have again a choice of "fine" (denoted by the two dotted line symbol) or "standard" (denoted by a single dotted line symbol). The standard format gives smaller file sizes and again should be considered if the output need is largely web pages or social media sites.

Normally I would always suggest using the "fine" setting as this gives you the best image quality – which after all is the reason you purchased the Panasonic Lumix FZ200!

You also get the option to record JPEG and RAW simultaneously which gives you immediate access to the JPEG file and then the RAW file for processing into a better image at some time later.

Using this method you could have a small file size JPEG file for reference and the RAW file in your image library. The file size of the RAW file is quite large (10 -12MB) compared to the 3-4 MB file size of the Fine JPEG file.


Camera Sensor, ISO and Light Sensitivity

A knowledge of how the camera, or more specifically the camera sensor, reacts to light falling on it from the lens will help to understand in which situations the Panasonic Lumix FZ200 will underperform unless you intervene to correct its automatic behaviour.

As you may be aware the Panasonic Lumix FZ200 has a small sensor, essentially the same size as that normally found in the small compact digital camera versions. It is technically classed as a $1/2.3$ inch sensor and its physical size is only 8mm across the diagonal.

1/2.3 inch

8mm
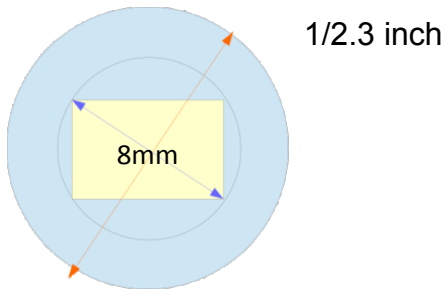
The "inch" dimension is really a hangover from the days when imaging was achieved using electron tube based television cameras and referred to the outside diameter of the glass imaging tube. Modern solid state CMOS sensors are now much smaller than the name suggests.

The "mega pixel myth" has treated camera manufacturers well over the years, with an ever increasing pixel count and often meaningless numbers. It has helped them sell millions of cameras. Fortunately, consumers like you and I, have become aware of this practice where it was far easier to sell cameras based upon mega pixels than perceived image quality.

1/2.3inch left and Micro Four Thirds sensors

Does Size Matter?

The size of sensor a camera has directly affects the amount of light needed to create an image with the correct exposure. Simplistically, the digital sensor (the digital equivalent of film that you may have previously used) consists of a large array (4000 x 3000 in the case of the Panasonic Lumix FZ200) of light sensitive calls called "photosites" - you may commonly have heard them referred to as "pixels".

The 12 mega-pixels are crammed onto the surface of the 1/2.3 inch sensor measuring just 6.3 x 4.55mm. Consider now a full frame sensor measuring 36mm x 24mm with the same 4000 x 3000 pixel count.

The size of the photosites are bigger and this increase in size allows more "photons" - that's the light particles radiating from the subject and focused by the lens onto the sensor – to enter the photosite to generate the "electrons" which are directly proportional to the amount of photons being captured. In practice the "photosites" are quite complex structures, each one having its own micro-lens to help gather the "photons" and direct them down to the photosite.

There is also a primary color filter above each photosite. These Red, Green and Blue filters are arranged in a mosaic pattern over the whole surface of the CMOS sensor.

The most popular arrangement is the "Bayer" system where there are twice as many Green filters as there are Red and Blue to simulate the spectral characteristic of our own eyes.

Bonded to the sensor is also an "anti-alias" filter which in effect softens the image to make it less likely to show "stair stepping" of diagonal lines in the image.

It is a real compromise between having enough anti-aliasing filter and effective output resolution.

The more you suppress the stair-stepping the lower the output resolution and your images look very soft.

Take out the filter altogether and you get problems with "moiré" and objects like fabrics and brick walls take on a characteristic moiré pattern – very undesirable in the final image. So what does this mean in the "real world"?

Well, the size of the actual sensor will directly decide on the optical characteristics of the lens needed to focus the photons (or light) onto the sensor.

As you probably know a lens projects a circular image (upside down) to points of focus (called the focal plane). It is at the focal plane that the imaging sensor is placed. The image circle must be physically large enough to cover the diagonals of the imaging sensor.

Imaging circle and sensor size

The imaging circle from the lens covers the camera sensor. The size of this imaging circle will define the optics of the lens. The smaller the imaging circle the smaller the exit diameter of the rear element of the camera lens. Therefore small sensors like those in mobile phones have very small lenses; sensors like those in full frame cameras need larger lenses to create this image circle. This leads us nicely into how smaller sensors have more DOF (depth of field) or conversely why full frame cameras can produce extremely shallow DOF images.

1/2.3 inch sensor   Full frame sensor

The image focused by the lens, shown by the red light paths is what will be "in sharp focus" on the sensor surface (red bar). The parts of the image which are farther away would be focused within the position shown by the green bars and those parts nearer by the position within the blue bars. The depth of these two focus zones is much smaller in the case of the smaller lens element. Therefore for the smaller lens the distance of this focus plane depth is nearer the sensor and thus appears to be sharper than the same image focal position with the larger lens. The physics definition refers to this as the "circle of confusion" and it is this which determines the DOF, or apparent depth of sharpness of the respective images. The "quality" of this out of focus area is sometimes called "bokeh" or the Japanese for confusion

Depth of Field and Focus Zones

The parts of the image which are sharply focused at the sensor surface compared with the appearance of the objects which are either in front or behind of the principal point of focus give rise to this "out of focus" look. It is determined by two elements, the lens focal length and its aperture. You will find more of this important aspect later in the book.

The actual sensor itself has a fixed sensitivity to the photons which strike the photosites. The bigger the photosite area the more photons can release the electrons producing a bigger output voltage from the cell.

This voltage is generated from a very low output when no photons (no light) strike the sensor to a maximum voltage when the photosite becomes fully charged, or saturated.

This very small, analogue voltage contains an element of noise due to a few factors, temperature – the higher the ambient temperature the higher the noise, "shot noise" from random electrons being generated without being triggered by a corresponding photon strike and from electrical connection noise where the interconnections are made to the silicon wafer.

This analogue voltage needs to be digitised so that the camera processor can do the maths to calculate exposure.

This small analogue voltage is amplified by an electronic circuit and its gain is directly related to the ISO value which we have come to understand to be the measure of sensitivity of the camera.

In numerous publications there is the erroneous statement that the ISO changes the sensor sensitivity to light. The sensor always has the same output irrespective of the ISO set.

It is the amplifier which is connected to the output of the sensor photosites which has the gain changed by the ISO setting. At the lower ISO setting of 100 there is little, or no, gain applied to the photosite output so both the signal and noise are amplified to the same amount.

As we increase the camera ISO setting we change the amplifier gain to make the output voltage change. It is this amplification which amplifies both the analogue voltage which is being generated as a result of photons striking and releasing electrons and the noise from all the other sources.

The signal to noise ratio decreases as we amplify the signal more (due to additional amplifier noise being added). This results in more noise being interpreted as image pixels, rather than those directly corresponding to the real image light derived output.

It's like listening to an AM station on your radio. You can hear the background hiss.

Turn up the volume to hear the radio station more clearly and you notice the associated increase in background noise.

When processing the image data into a JPEG file mathematical formulae are used to reduce the appearance of noise by effectively blurring the pixels. You can control this in the photostyle menu settings to reduce the effect of this blurring to achieve sharper looking images (noise reduction set to -2)

Original image and below the crops

ISO 100   ISO 400   ISO 800   ISO 1600   ISO 3200

Crop Factor - the crop factor is a multiplier number which is the ratio of the width of the sensor compared to that of a "full frame" 35mm sensor. The 1/2.3 inch sensor has a crop factor of 5.6x based on 35/6.3

The FZ200 Lens

This explains the notation on the camera lens. The 4.5mm to 108 mm markings refer to the real focal length of this lens which equates to 25mm at the wide angle position and at the full zoom 600mm. Note the 1:2.8 refers to the constant aperture over the entire zoom range, although you can select up to F8. This makes this one of the most outstanding features of the camera. No other current bridge camera can match this lens performance, optically.

Aperture or f-stop - the aperture of the lens is the component which is used to control the amount of light reaching the sensor.

The FZ200 has an aperture range of F2.8 to F8. The aperture, or "f- stop" number is mathematically the result of lens focal length / the diameter of the aperture (hole size of the diaphragm blades).

With each increase in the f-stop number (i.e. we go from a smaller number to a larger one, say F4 to F5.6) we half the amount of light reaching the sensor.

In the next table I show the f-stops with the whole f-stop values in red and the 1/3 f-stops in blue. So we have a 4 stop f-stop range or 8 times exposure difference.

Note the bigger the f-stop number, the smaller the size of the aperture. So "wide open" the lens is at f2.8 and fully closed it is at F8.

There is a practical limit to how small the aperture can be before it starts to degrade the image through a phenomenon called "diffraction".

The smaller the lens diameter and the tighter the pixels are together on the sensor, the sooner this limit is reached. Interestingly the mathematical calculation results in a value of f4 in the case of the FZ200, where in something like a Canon FX sensor DSLR it is F22.

F2.8   F3.2   F3.5   F4   F4.5   F5   F5.6   F6.3   F7.1   F8

bigger   smaller
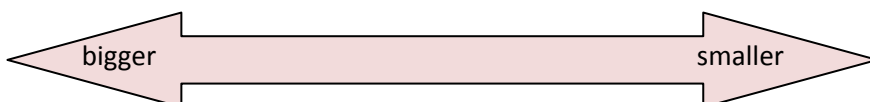
Shutter speed - this controls the amount of time that the light passing through the lens diaphragm (or f-stop) reaches the sensor.

The amount of time multiplied by the light passing through the aperture setting gives us the exposure.

When the aperture is set to a value which we want for a particular depth of field then there will be an associated time value (or shutter speed) required to achieve the correct exposure so that the image looks correct.

So for example if we have an aperture set on the camera at F4 and the exposure system determines that a shutter speed of 1/60 second is required to give the correct exposure, then if we adjust the aperture to a smaller size (larger number) say f5.6, which is 1 f-stop increment smaller, the camera will adjust the shutter speed to a longer value to allow the same quantity of light (time x intensity) to reach the sensor.

In this case the shutter speed will go from 1/60 second to 1/30 second i.e. the time doubles.

Here is the important relationship we must understand, increase the intensity of light by opening the aperture (going to a smaller f-stop number) means we need to make a corresponding decrease in shutter speed to keep the exposure the same. Remember equal and opposite!

Shutter speeds are indicated as a fraction below 1 second, e.g. 1/25. Speeds longer than 1 second are indicated 1" 2" 4" 8" etc.,

The fastest shutter speed of the FZ200 is 1/4000sec and the longest is 60 seconds in the manual, with manual focus mode.

1/125, 1/100, 1/80, 1/50, 1/40, 1/30, 1/25, 1/20, 1/15, 1/13, 1/10, 1/8, 1/6, 1/5

Faster   slower
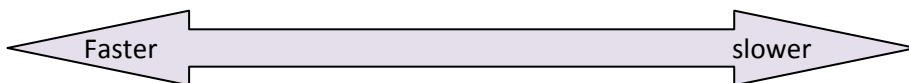
The higher the fractional number, the faster the shutter speed is.

To crystallise this, think of the correct exposure as being a glass into which we will poor some water. When the glass is 50% full, that is our perfect exposure. If we pour in water very slowly (representing a low intensity of light) it will take longer (the shutter speed analogy) to reach the correct exposure level than if we poured the water into the glass more quickly. (Over-fill the glass and we lose our highlight detail with the result in the highlights being "blown-out")

Correct exposure level
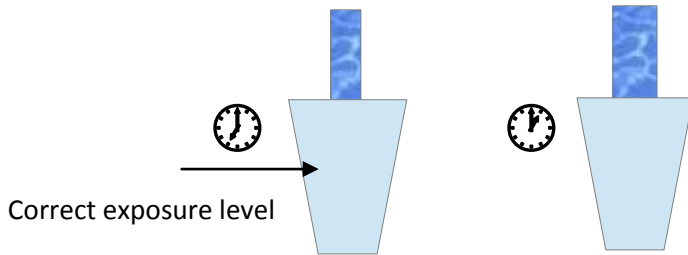
The time taken to fill the glass is longer with a small flow of water (representing the amount of light passing through the aperture) than with more water flow (representing more light – or a larger aperture)

This relationship is the key to you understanding how to be able to set up the camera when you want to use the manual mode (M)

ISO *(International Standard Organisation)* This is the value which is attributed to the combined camera sensor and the logarithmic amplifier and then the analogue to digital converter system. If you leave the camera set with the default factory set up the ISO values are increased or decreased by a fixed value equivalent to 1 full aperture increase (or decrease) or doubling (or halving) the shutter speed. This is referred to as 1 EV (standing for exposure value) You will notice that with this 1EV increment set the ISO values change as in the table below

100	200	400	800	1600	3200

If you change the increments in the set up menu to be just 1/3 EV you have finer control of the camera sensitivity and hence noise control full ISO (1 EV increments shown in red)

100	125	160	200	250	320	400	500
640	800	1000	1250	1600	2000	2500	3200

Increasing the number increases the camera's overall sensitivity to light allowing the camera to acquire images in low levels of light with the ability to shoot hand held. As I mentioned previously increasing the ISO

value also amplifies the "noise" in the system resulting in images with lower visual sharpness and image contrast. This noise usually appears in the darker areas of the image (the shadows) but even if the camera is used outdoors in bright sunlight, say in order to get a fast shutter speed for an action photograph the resulting image will be visually un-sharp compared to one shot with lower ISO numbers.

For general photography, whenever you can, use the camera at ISO 100. The camera optical image stabilisation should always be set to ON and this will allow you to use some fairly slow hand held shutter speeds (1/30 second or less depending upon your own hand shakiness) and provided that there is no subject movement which needs to be arrested you will find you get some great images from this camera, especially if you select an aperture of F4.

We have seen how the interaction of aperture and shutter combine to give us the correct exposure for our image. Up until this point I have assumed that the camera sensitivity has remained unchanged however we must take a look at how all three of the components of exposure work together to produce the final image. The "Exposure Triangle"

The Exposure Triangle

ISO

NOISE

-2 -1 0 1 2

DOF   BLUR

Aperture   Shutter Speed
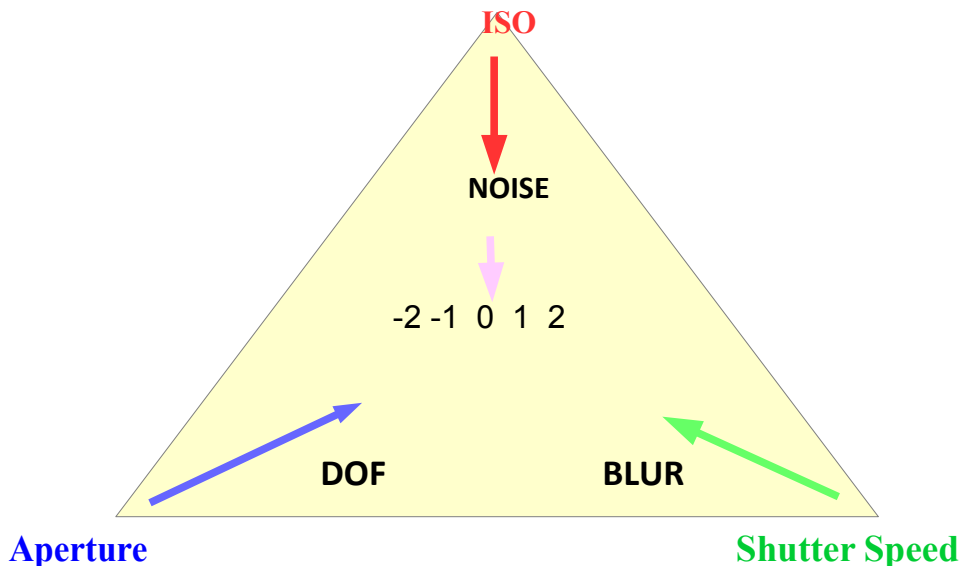
Higher ISO leads to more image noise, slower shutter speed gives more motion blur and a smaller Aperture (larger f-number) provides more DOF.

In the exposure triangle, shown on the previous page, the entire relationship is shown for the inter-relationship of ISO, Aperture and Shutter speed. In the centre of the triangle is the perfect exposure which will show as 0 EV on the camera exposure meter.

If we make modification to one element of the exposure we have to make an opposite compensation to one or both of the other.

For example if we decrease the aperture from f4 to F8 (2 complete F-stops or "EV units") - this reduces the light entering the camera.

We then need to increase either the ISO by 2 EV or to decrease the Shutter speed by 2EV to compensate.

(Or we could change each parameter by the 1EV - increasing the ISO by 1EV and reducing the Shutter speed by 1EV).

In the triangle we can see the effect of changing any element.

Changing ISO results in more noise if you increase it.

Changing Aperture affects the Depth of Field (DOF) - smaller apertures (larger f-numbers) giving more DOF.

Changing shutter speeds affects both camera shake and subject motion blur, longer exposures introduces more blur.

You have to evaluate which of these three parameters is the main element in taking your image:

low ISO for lower noise.

higher shutter speed to reduce motion blur.

aperture size for shallow, or greater, DOF.

Chapter 2

Intelligent Auto Mode Shooting (iA)

The iA shooting mode is the fully automatic mode by which the camera takes control of every function to deliver the best possible image quality.

In this mode, which we usually refer to as, "point and shoot" employs automatic scene selection, intelligent sharpening, face detection, subject tracking, dynamic range improvement digital zoom and more.

Let's take a closer look at the iA mode and see if it offers anything useful other than just the ease at which a newcomer to the camera can quickly begin to enjoy beautiful images or should we be more adventurous and move the control dial to a semi-automatic mode or even take full control of the image making process and switch to the fully manual mode?

Before we continue it is worthwhile taking a quick look at the menu system so we can understand how to get the camera set up in these modes.
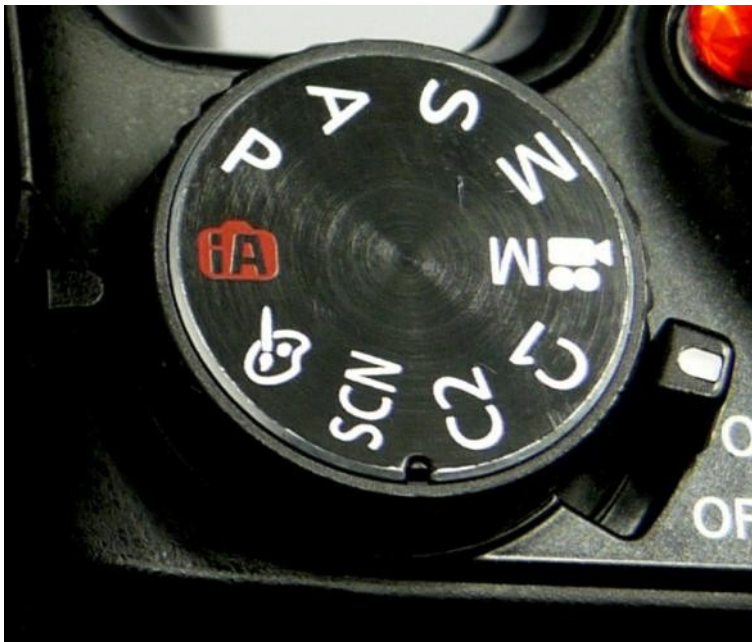
Menu Systems

To begin to explain the menu systems employed with the Panasonic Lumix FZ200 I would like to illustrate the convention I will use to access menu items

for example: Menu/set ▼Picture size ►3.5M Menu/set

means press the menu set button, cursor down to Picture size option (using the 4 way navigation button) and then cursor right and then select the 3.5M setting and then press the Menu/set button to close and save this setting.

and: Menu/set ◄ ▼ motion picture tab ► Rec Mode ▼ MP4 Menu/set

means press the menu set button, cursor left to access the tabbed pages (using the 4 way navigation button) and then cursor down and select the motion picture tab setting and then cursor right for Recording mode and then select MP4 and then press the Menu/set button to close and save this setting.

In the iA (or the new iA+) mode the camera makes all the exposure decisions for you. You simply have to concentrate on framing the image exactly as you want the image to appear. Inside the camera's processor is making hundreds of calculation every second as you half depress the shutter button. It analyses the brightness and color as well as the distribution of dark and light pixels in order to build up a "picture" of what scene is being recorded by you. It uses this "picture" to try and match your image to a set of standard images which represent the main classification for the automatic scene detection modes of:

i-Portrait ►i-Scenery►i-Macro►i-Night Portrait►i-Night scenery►i-Handheld Nite Shot►i-Sunset►i-Baby

If your image type matches one of these pre-set conditions the camera will apply settings which the Panasonic software developers have determined are best for these conditions. If a match is made then the symbol changes at the top left of the screen from iA to one of the pre- set icons. If a match is not made the icon remains the iA symbol and the camera uses a standard set of parameters to expose the image correctly

As this is a "computer" based guess sometimes the choice of pre-set may be entirely wrong for the scene type you are trying to capture.

It's worth keeping an eye on the indicated symbol and if this does not match your scene type it will be prudent to switch to a pre-set scene type by use of the top Mode dial, turning it to SCN and then selecting the appropriate scene from the menu to take your image.

If the camera detects the scene has a very high back light component the camera will automatically attempt to correct it by increasing the overall brightness of the picture. In this situation the back light compensation icon will be indicated on the display.

Let's have a look at some of the menu specific entries that appear on the Panasonic Lumix FZ200 LCD.

With the top mode control dial turned to align the iA position against the moulded index mark on the top of the camera body and then when the MENU/SET button is depressed we are taken into the first of the menu choices for the intelligent auto mode. We have a choice of the standard of the new iA+ mode which adds a little more *user control* options.

Mode dial set for iA

[Tip: note the little red jewel that I stuck on the record button gives you a more tactile feel – especially in winter when you are shooting with gloved hands]

iA mode selection

Standard or iAplus

To select the new iA+ mode you will need to cursor right, twice, using the navigation key (until the iA+ symbol turns yellow) and then to exit the routine use the MENU/SET button again to return you to the normal display screen.
MENU/SET ►►MENU/SET
IA+ mode adds the additional controls of exposure compensation and color tint to the existing background defocus option
To access the options available for stills picture mode (rec mode) you need to press MENU/SET then cursor down and then cursor right to enter the individual page(1) items.

Stills (rec mode)

Page 1 selected

You can now select any of the options in this menu list by cursoring down to the item and to make changes you cursor to the right whilst on that menu line.

Selecting a image size

In illustration 30 the menu item selected is the Picture Size; cursoring right (►) brings up the image size selection as shown left. The choice of image size is really down to the output medium you wish to use to display the image. If you are interested in producing large prints from the image it makes most sense to use the highest number of pixels and the aspect ratio nearest to the aspect ratio of your chosen print size.

Here is a reminder of the standard print sizes. Choose 16:9 9M for HDTV images.

Size inch	Size mm	pixels	Aspect ratio
5 x 3.5	127 x 89	1500 x 1050	10:7
6 x 4	152 x 102	1800 x 1200	3:2
6 x 4.5	152 x 114	1800 x 1350	4:3
7 x 5	178 x 127	2100 x 1500	7:5
8 x 6	203 x 152	2400 x 1800	4:3
10 x 8	254 x 203	3000 x 2400	5:4
12 x 10	305 x 254	3600 x 3000	6:5

The next item in the menu list on *page 1* of the iA menu choices is **Color Mode** This is used to modify the way in which colors are recorded with the Panasonic Lumix FZ200.

Color mode choices

This setting can be made for Standard, Happy, B/W or Sepia. If you select Happy, the colors are a little bit more vibrant with higher saturation. B/W gives you a pleasing monochromatic image and Sepia gives you a rich amber color to the images. Remember though all these effects can be achieved in post processing, retaining the original standard color style.

Motion Deblur. When you enable motion de-blur, from the menu, the camera will analyse any subject motion and calculate an exposure time with which the camera will use to arrest this movement. In doing so it might reduce the image size if the ISO has had to be raised if the camera cannot achieve a good exposure after opening the aperture to f2.8

Motion Deblur option

Hand held Nite Shot This option in the set up menu, when it is enabled and the iNight scene is detected and it detects that the camera is hand held (not on tripod etc) the camera will shoot a series of exposures and then composite them into just 1 image. In doing so it can eliminate a lot of image noise to produce a more pleasing image in the low light conditions

Handheld Nite Shot

iHDR intelligent high dynamic range is a method by which the camera

iHDR Mode

can attempt to embrace a scene of high contrast and process the shadows and highlights to compress the tonal range recorded. With this method you will see more detail in the shadows and the highlights may be retained but the overall effect is to give you an image which does appear "flat" and may need post processing, depending upon how you want the image to finally look. In some instances even with iHDR enabled the camera may be able to produce the contrast reduction but without the need for multiple images being taken. You also need to be aware that if there is any subject movement taking place during the multiple exposures this will be captured and may show as "ghost" images on the final image.

An HDR image

Face recognition - Face recognition requires that the camera first of all registers faces by performing a registration procedure to store the names, and age of the subjects. During shooting if the camera recognises a face

or faces it will set the focus on the prime subject. If there is more than 1 face in the picture, the order in which it sets priority is determined by you during face registration procedure.

Face recognition may fail if the size of the image is too small (or zoom is used and the face is too large) for the software to analyse, or if the subject is too light or too dark or is in motion I will cover face registration later in this guide book.

The iA+ Mode This new mode is similar to the basic iA mode but allows some user intervention to adjust the way the final image is recorded. You have the;

background defocus option (as in the basic iA mode)
exposure compensation
color tint
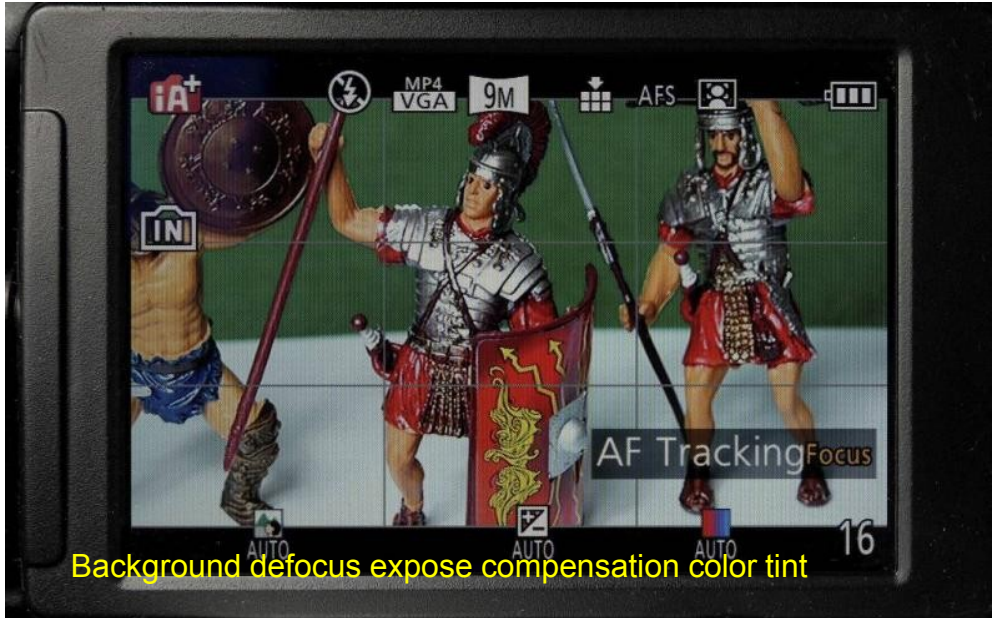
iA+ user options

To access any of these user controls you need to push in the back control dial bring up the choice of control to adjust.

*Back control dial*

Exposure adjustment

Exposure adjustment

In this illustration the control selected is the exposure compensation option which allows you to brighten images where the camera is underexposing or darken those which are being overexposed. Use the left and right navigation keys, or turn the back control dial to make the adjustment and then press MENU/SET to lock it.

If the metering mode is set to average or centre-weighted the camera may under expose as shown opposite. This is because of the brighter background.
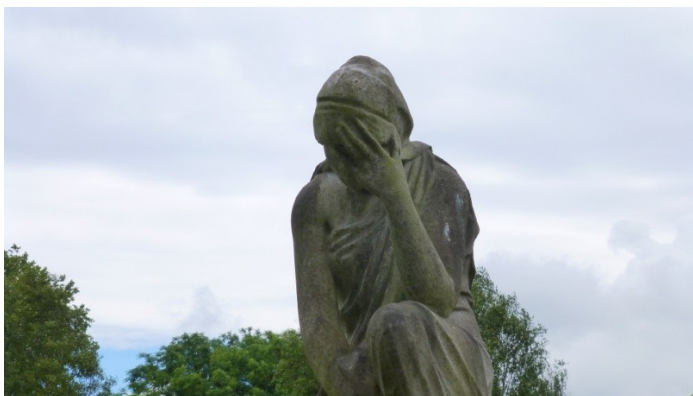
If you use the exposure compensation feature you can make adjustment for this as shown opposite. Move the slider towards the + to brighten the image.

Background defocus

Background defocus

This control effectively gives you direct access to the aperture control. As we know selecting a large aperture (smaller f stop number) gives us shallower depth of field (DOF) making the background blurred, or defocused.

The slider control shows the icon of a head and distant mountains, by default the camera selects the wide open f2.8 aperture to give the most defocused background as you use the navigation buttons, or turn the back control dial, you can move the slider to the right. Here the icon shows the mountains more clearly – the result of selecting a smaller aperture with more DOF. In essence this control allows you to select f2.8 to F8.

Color tint

This adjustment allows you to add some color bias to the image. Moving the indicator slider to the left adds some warmth to the image whilst moving it to the right will add blue to the image and make it appear cooler.

To illustrate just how good the iA and iA+ modes can be I have included, by kind permission, some images by Peter Sheppard from New Zealand who uses the FZ200 extensively on his travels. Please check out his work: http://flickr.com/peteshep/sets

In the following images you can see the richly saturated colors, yet retaining good flesh tones, detailed shadows in the very bright side-lighting and little highlight loss on the specula reflections from the metal.


Peter Sheppard – Phyang Festival Ladakh. Himalayas

Peter explained his choice of the FZ200:
Travel photography needs a robust, compact, and flexible-in-use camera. Loose lenses rolling down the mountainside or letting dust onto sensors, clumsy weak tripods, etc, are out of the question to me. You'll see in the shots, faces, sunny landscapes, dark monastery interiors. The f2.8 zooming 25mm to 600mm, with an excellent stabilizer, handled them all in a single compact camera. Using the iA background de-focus mode allowed me to set DOF, as needed, and it allowed "point and shoot" for sophisticated results!

Peter Sheppard – Phyang Festival Ladakh. Himalayas
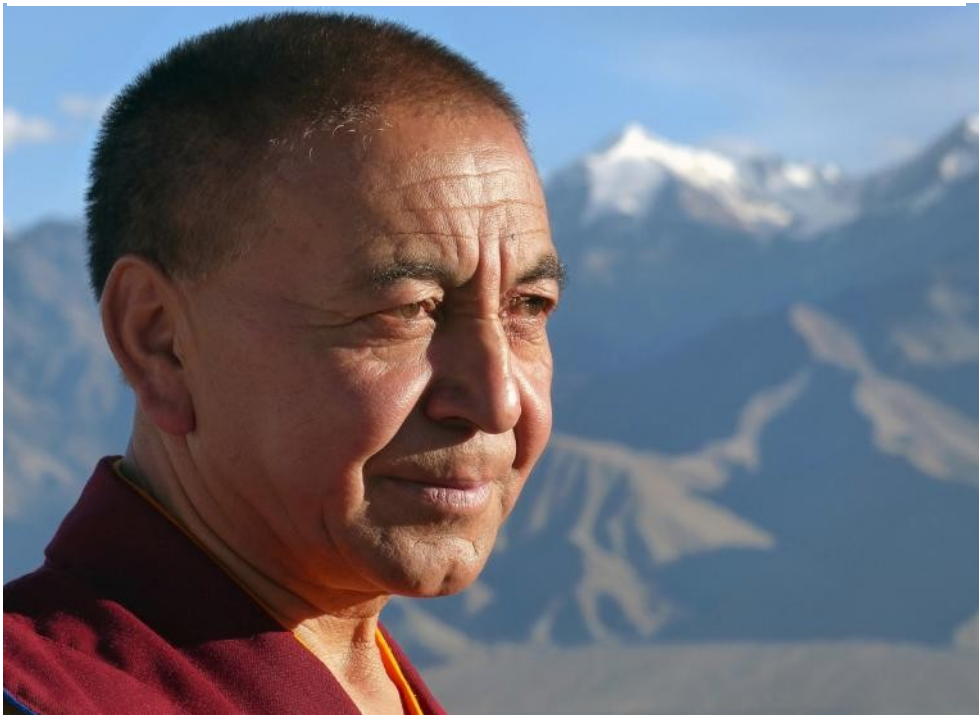
Peter Sheppard – Tibetan-Buddhist monk at Shanti Stupa Leh, Himalayas

Using the Scene Modes

Scene Mode

Scene modes are automatic modes with exposure parameters which have been pre-set to give ideal images in those matching situations. If you are using the iA mode an see that it has incorrectly recognised the scene type (by looking at the icon at the top left hand side of the display) it is recommended to switch to the correct scene mode by using this method otherwise the image quality may not be optimal. The Scene Mode is accessed by turning the top mode selection dial to align the SCN against the index mark on the camera body and then pressing MENU/SET button to bring up the menu choices for this automatic mode. Use ► to step through them.

Pre-set Scene Modes (left to right top to bottom descriptions)

The Portrait mode. Is a useful mode for taking pictures of people outside during the day as it helps to improve skin tones. To really make this mode work for you consider using maximum telephoto setting by zooming all the way in to maximum, then position yourself as close as you can to your subject to fill the frame with head and shoulders. Try to keep the subject as far away from the background as you can and, if possible,

try to select a background which is not too obtrusive. This will make the portrait shot look much better with a nicely blurred background which will emphasise your subject.

Soft skin. Is similar to the portrait mode scene mode however in this mode some softening of the image is introduced to mask any slight skin imperfections. As with portrait mode it is enhanced by using the same camera to subject and subject to background distances as outlined previously.

Scenery mode. Allows you to capture wide vista landscapes, it sets the camera to a small aperture to maximise the depth of field (DOF).

Panorama shot. In this mode it allows you to use the camera to capture and stitch together a series of images to build up a landscape

Left to right panorama

or portrait oriented panorama shot. After making this scene mode selection use the ▼▲ navigation buttons to select the direction and orientation of the proposed panorama shot.

These choices are left to right, right to left, down to up and up to down.

On the lcd display will be a horizontal guideline which denotes where the scenery should be located in for this effect to work properly.

The camera will lock focus, white balance and exposure for the first image in the sequence and then use this setting for the remaining shots.

It must be noted that if the scene brightness or focus distance changes throughout the sweep these will be noticed on the final composite image.

The arc of movement is around 180 degrees so ideally stand facing the half way point of this sweep. Pivot your upper body from the waist upwards so your starting point is 90 degrees from your start point.

Press the shutter half way down to focus and lock the expose and then fully depress the button and then slowly pivot your body to the opposite end of the arc.

Aim to be facing your midway position after 4 seconds and the completion of the arc in about 8 seconds.

Keep the button fully depressed throughout the entire movement. The image sequence is terminated when you release the shutter button, you stop panning the camera or the camera capture window closes. Noticeable distortion may occur before and after the central point of the sweep and some joins may be visible if the camera is not held level during this sweep. There are a number of situations which may prevent a panorama being recorded. For example if the area contains a lot of even tone or uniform color and a repetitive pattern, or moving objects appear in the sequence or the area is illuminated with lights which result in flickering being reproduced at the selected shutter speed then these may not be recorded

During a horizontal panoramic capture the image resolution is 8000 pixels by 1080 and during a vertical capture 1440 x 8000.

During playback the image will scroll in the direction of the recorded motion and looks best when displayed on a TV screen in HD format or used in a video program where a panoramic sweep can be made from the 8000 x 1080 pixel image. *It gives very superior detail compared to the equivalent sweep being made with the camera in video mode.*

Sports. This mode should be selected if you want to capture a subject which has large amounts of fast action taking place. The camera will set a high shutter speed and if necessary raise the ISO to enable this fast shutter speed to happen, therefore more noise may be noticed in this mode – especially in poorer lighting conditions.

Panning. This mode is particularly effective if you want to capture an image of say a motor car, cyclist or other vehicle which will have a predictable motion which is parallel to the camera.

Select the option in the menu and then chose from the *Auto or Shutter-priority* mode.

If you elect to use shutter priority where you want to control the amount of blur then the pushing in the back control dial will alternate between exposure compensation mode and setting shutter speed.

There is a technique which has to be learned to get good panning shots. There is a fine balance between achieving an image with enough background motion blur and one which has too much subject blur due to too slow a shutter speed.

The technique basically means you will be framing the subject, pivoting your body through a 180 degree arc following the subject in the viewfinder and trying to keep the image at one position in the frame as you pivot.

Press the shutter release as the subject is opposite you and then keep the camera moving at the same speed and direction as you do so.

I recommend that you use the EVF for this procedure as it is easier to track the subject this way and also enable the burst firing mode (5.5 AF) but use a manually set focus point, set to the position the subject will be at when it is opposite you.

You can change the shutter speed to increase, or decrease, the amount of background blur but remember to keep it high enough to prevent camera shake destroying the crispness of the main subject in the panning sequence.

Night portrait. This mode needs some care to get the result to look natural. It basically sets the exposure to try and capture some detail in the surrounding background, however you have to use flash as the principal source of light in the picture and the camera reminds you to raise the flash head.

As the ambient light exposure can be up to 8 seconds it is essential to use a tripod if you are shooting in such low light.

Additionally there is an equivalent time equal to that of the exposure time for in camera noise reduction processing.

Night scenery. Again this mode utilises a long time exposure to capture an image and there will be an associated noise reduction time equal to that of the main exposure.

Again it is essential to use a tripod or other means of support to get good, blur free images in this mode.

Night scenery mode

Handheld nite shot. In this mode the camera performs multi - exposure, high speed bursts and then processes them into a single image which then has increased subject brightness and reduced noise.

In some cases there may be subject ghosting if the subject happens to be moving for example.

HDR (high dynamic range). Using a series of exposures with varying intensities from under to overexposure the camera can combine these images during processing to allow detail to be seen in shadow (dark areas) and highlights (light areas).

The resulting image may appear to be "flatter" through using this process and if there is any subject motion in the sequence it may appear as ghosting in the composite image.

If the camera determines that the exposure contrast range is within what the camera can achieve in a single exposure it will not execute the exposure sequence to capture the image.

HDR image

Food. Allows you to capture food dishes with natural looking ambient light. The camera will choose a wide aperture and ISO of 400 to achieve this so there will be reduced depth of field and possibly more image noise using this mode.

Baby1/baby2. Are essentially the same mode which allows you to set different baby name/age with each of the menu items.

This mode, if used with the on-camera flash, will fire the flash at much reduced power to allow a lot of the ambient light to be registered.

The baby's skin is emphasised. As the camera will be essentially using the ambient light, if this is low intensity then the camera will raise the ISO after reducing aperture to f2.8 so there may be visible noise in the image.

Pet. Use this mode to take images of your pets, it essentially just allows you to attach a name and age to the image just as in the baby mode.

Sunset. This mode emphasises red saturation in the image, ideal for taking sunset pictures.

High Sens. Uses a high value ISO (1600) and a reduced image size (4: 3 3M largest size) to allow you to capture images in very low light intensity. There may be severe noise in the image depending upon the areas of dark in the image.

Glass (through). This mode is designed to allow you to shoot images through glass, such as in cars and trains or aero planes or through building windows. It may not work if the window is dirty as it will cause the camera to focus on the dust rather than at the subject.

3D. Allows you to create a three dimensional image by allowing the camera to select 2 images from a sequence made by moving the camera horizontally through about 10 cms. (4 inches) for 4 seconds. You of course need a 3D capable device to see the 3D file MPO file.

In creating this image the camera is fixed to wide angle setting, the picture size is restricted to 2m at the 16:9 aspect ratio – however this is an ideal size for HDTV viewing. In some situations the image file might not be created such as if the subject is too dark/bright or if the subject is moving or if there is insufficient contrast in the scene.

Before moving on from the iA modes it is worth just reviewing the other automated capture modes which allow a little user intervention to create more interesting effects, the Creative Control.

Using the Creative Control Mode

This mode allows users to record images with additional creative filter effects.
These can be previewed in real time before the image is captured. This

control applies the changes to the image and then writes the image to memory. If you want a quick effect then this control will deliver this option, however all the same creative filter results can be applied to a "normal" image via the playback, creative re-touch menu, which creates a new image from the existing image keeping the original from any applied changes. With this alternative method you can create several different effects from the on image, keeping the integrity of the original image.

To use the creative control features turn the Mode control dial to the "palette" icon so that it aligns with the index mark on the camera body. Press the navigation buttons to scroll through the options ▼▲.

Select the image effect which suits your preference for the scene you are capturing. Push in the back control dial to access the options to set exposure compensation, background defocus and image effect. Rotate the back control dial to alter the control setting.

The effects are maintained even if the camera is turned off and on again, white balance is locked to auto and ISO sensitivity is AUTO.

Expressive - the image effect control adjusts the saturation of the colors in the image from pale to highly saturated.

Retro - the image effect control adjusts the color emphasis from yellow through to red.

High key - the image effect control adjusts the ambiance of the image from a hint of red through to a pale hint of blue. The image is biased to record the highlight features and to lighten the shadow or dark areas.

Low key - the image effect control adjusts the ambiance of the image from a hint of red through to a pale hint of blue. The image is biased to record the shadow or dark features and to darken highlights to produce a more sombre image quality.

Sepia - the image effect control adjusts the contrast of the sepia toned image.

Dynamic monochrome - the image effect control adjusts the contrast of the image which has been converted to a dramatic black and white one.

Impressive art - the image effect control adjusts the tone of the image from monochrome to one with highly saturated colors.

High dynamic - the image effect control adjusts the tone of the image from monochrome to one with highly saturated colors and also adjusts image contrast for optimum balance between the highlights and shadow regions of the image.

Cross process - is an interesting effect which mimics the days of film processing where one type of negative material is processed in the wrong chemical process e.g. reversal film (transparency) processed in C-41 color negative chemicals. The image effect control adjusts the way in which the effect is applied. You can choose Green, Blue, Yellow or Red tones to be emphasised.

Toy effect - the image effect control adjusts the color tone from Red to Blue and the image has a vignette applied to darken the periphery of the image, such as you get from a cheap plastic camera.

Miniature effect (diorama) - the image effect control adjusts the color tone from red through to blue.

To create the central band of sharpness you need to press the Fn3 (function 3) button adjacent to the navigation buttons. This opens a display where the vertical (for landscape images), or horizontal (for portrait images) position of the band can be set using the navigation buttons ▼▲ for landscape mode and ►◄ for portrait mode. The back control dial adjusts the width of the band. If you press the DISP button the original positions are restored. The image may take a while to process in the camera after the shutter has closed, especially if the image size is large.

Soft focus - the image effect control adjusts the amount of soft focus blur applied to the image.

Star filter - with this filter enabled any highlights are transformed into star effects. The image effect control adjusts the length of the highlight points from short to longer.

One point color - with this effect you can select the color that is to be retained in the black and white image which is generated. Use the Fn3 button to display the setting screen. Align the small central frame on the color you wish to retain in the image and then press MENU/SET. Some colors may not be totally removed and areas of similar tone may be removed. The image effect control adjusts the saturation of the remaining color.

Examples of Creative Control Effects

Images using the expressive control features

Adjusting the control to the left reduces the effect and to the right increases it.

| Expressive color low | Expressive color high |

Retro less	Retro more
High key	Low key
Sepia	Monochromatic
Impressive art	High dynamic

Cross process, green channel	Toy camera
Blur, hard	Blur, soft
Star (no highlights to effect)	One point set for hat, low effect
One point, set from face, low	One point, set from face, high

The miniature effect

One point color (some red remains of the brickwork –same hue)

We have now had a brief, introductory tour of the fully automatic (plus a brief look at user customisation) modes.
Before we look at the semi-automatic modes we need to consider and understand file formats available for recording our still image files on the SDHC card.

Choosing Image Format and Quality

One of the most important set up choices is to make a choice of the image quality for the intended use of the image file. Until recently users routinely chose lower image resolution to get smaller image file sizes in order that they could fit more images on the SD/SDHC card.

As media sizes have now increased, and costs have significantly reduced this is no longer a valid reason to restrict yourself on image resolution.

With a 4GB SDHC card in the Panasonic Lumix FZ200 you can fit over 700 full resolution images on that card – more than enough for a day's shooting for most users.

With these large resolution images it does give you the scope to print larger size photographs, or crop into the area to improve composition etc.

Another choice is the actual format that the image will be stored in. As a new user to the camera it may not be important at this stage to consider this option.

However as your skill level increases and you want to improve on the image quality you may reconsider this at a later stage.

We are talking about the usual file type of JPEG (*Joint Photographic Experts group*) and the more advanced RAW format.

JPEG Format

JPEG is the most common file used for storing digital picture images. This method of saving the image information into a small file on the SDHC card uses a compression system to reduce the file size.

In the case of the Panasonic Lumix FZ200 it can use one of two levels of compression, one described as Fine JPEG and the other Standard JPEG.

Standard JPEG uses a higher compression, discarding more image information, in order to produce the smaller file sizes.

For this reason JPEG is often referred to as a "lossy" file format. Whilst any level of image quality loss isn't ideal data loss at a lower compression isn't that noticeable in prints.

As a point in question here, if you edit a jpeg image on your computer and then save them again as a jpeg file, the data loss is compounded. The more times you open and save the file (with a new filename) the more information is discarded. If you intend making several adjustments to an image it is sensible to have a "master copy and make the adjustments to it saving it as a new file name. If you need to make more adjustment re-open the master file for editing rather than the file you created from it.

Another advantage of JPEG files is that they can be universally displayed on computer screens, mobile phones, tablets and other digital display devices.

They can also be printed directly from the SDHC in printers equipped with a suitable card reader.

Because of the smaller file sizes it does allow you to use the Panasonic Lumix FZ200's burst speeds to advantage as the amount of time the images remain within the camera buffer are considerably reduced compared to the same RAW file format.

In the Panasonic Lumix FZ200 the12MB image file is reduced by a factor of about 4, depending upon the scene type and image detail resulting in a typical 3-4MB fine JPEG image.

There is a significant down side though of using the JPEG file, however for most amateur users this may not be such an issue, depending upon, again the output need of the image file.

The camera sensor, and associated analogue to digital converter chip produce a 14 bit data output.

Each bit in the data "word" has a power of 2, so going from the least significant bit to the most significant bit is 2^{14} or 16384 discrete levels of color in each of the Red, Green and Blue parts of the image. In contrast the 8 bit JPEG file has only 2^8 or 256 discrete levels of color.

It might sound a drastic reduction in color data loss but the process is done judiciously. Combine the color information loss with JPEG compression at 4:1 before it is stored on the card you can see it is quite a "lossy" system.

For most photographers who only perform minor adjustments to the camera file in external editing software then JPEG is the most obvious file format to use, but always choose the "*FINE*" option to retain more image data.

For those users who want to preserve as much image information as possible then, for them, RAW is the most appropriate choice. There is the option to store both the unprocessed RAW file and a JPEG file at the time of capture.

This can have significant advantages that the JPEF file can be viewed directly and things like critical focus and composition checked immediately and should the occasion arise at a later date the RAW file could be processed to give the absolute best image quality.

There is a significant storage issue though as the RAW files are about 12MB each. I will explore the RAW file and its post processing later in this guidebook.

The JPEG "*QUALITY*" is set here

(*showing the "fine" quality selected*)

Jpeg Quality

All of the semi-automatic modes that we use with the camera rely on using the light reaching the sensor to determine both the focus and the exposure.

Let's take a look at how it achieves these two functions.

Exposure Metering Modes

The Panasonic Lumix FZ200 offers three ways in which the camera's optical system can be used to determine the correct exposure.
These are used in all the shooting modes of P, A, S and M as well as in manual movie mode and creative control.

Metering Modes

To access the three modes;
MENU/SET zoom lever twice to "T" setting to get to page 3 ▼▼►

Multiple area. In this method the camera effectively uses what you see on the LCD display to evaluate the distribution and intensity of the light falling upon the sensor.

Using this method ensures that anything which appears in the image is used to determine the ratio of dark to light, upper to lower and side to centre distribution of light intensity.

By analysing the upper to lower brightness ratio it can determine if you are shooting a landscape with sky and ground and if there is a central subject how bright that is compared to the background.

Generally this method achieves the best overall exposure determination. However as with all systems which are reliant on "*standard exposure situations*" sometimes when we present it with an unusual scene situation the image is not evaluated correctly, for example shooting on a bright white sandy beach or a snowy winter scene.

In both situations there is higher than average distribution of bright light in the scene and the camera will tend to compensate for this by reducing the exposure.

The result, on screen and in the resulting image, is for the image to look dark or underexposed.

Multiple area metering is ideal for general scenes

Here we routinely use the feature called exposure compensation to counter act the way the camera has reacted to this scene.

(●) is the symbol for the multiple area method

Centre weighted. When we know that the central area of the image is the most important area from which to evaluate the exposure without the result being influenced by brighter, or darker, areas outside this central area we can use this method to our advantage for example if shooting a portrait of someone or where there is a predominance of sky in a landscape scene.

( ) is the symbol for the centre weighted method

Centre weighted metering

Spot Metering. Spot metering uses a very small central area from which the camera evaluates the exposure.

It is very much dependent upon the placement of the cross hair sighting as to how the camera evaluates the exposure.

It is extremely useful if the subject is relatively small in relation to its surroundings which may influence centre weighted readings.

For example if you were to be photographing the moon both multiple area and centre weighted methods would force the moon to be a white orb, rather than have rich detail.

(+) is the symbol for the spot metering method
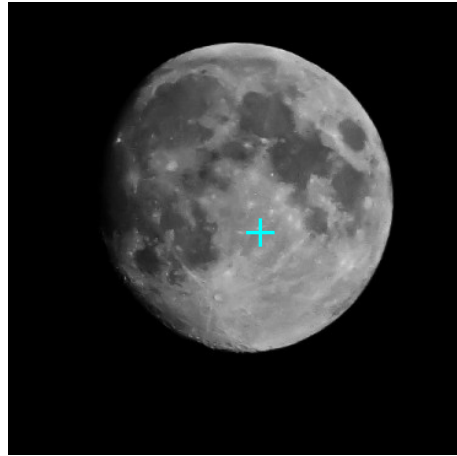
Centre weighted metering (cropped image)

Using the Spot Metering mode

Later in the guide book I will explain how to lock the exposure whilst using the spot metering method rather than holding the shutter button half way down as you re-compose the shot!

Now we have a better understanding of how the camera utilises the distribution of light falling on the sensor to evaluate what the correct exposure should be, and how to understand why, and when, it might be necessary to apply either exposure compensation or use the exposure locking button (*AF/AE Lock*) before we press the shutter button to take the final image.

We can now begin to look at how the camera determines when a subject is in focus when it utilises one of the autofocus modes and styles.

Autofocus Modes and Styles

Autofocus Modes

In the Panasonic Lumix FZ200 automatic focus system we have a choice of four modes and three styles. Selecting, and using, the right one to use can be quite bewildering for new users to this camera.

Again the camera uses light falling on specific areas on the sensor to utilise the difference in contrast an image has when it is in sharp focus and when it is out of focus.

By moving the focus lens element within the lens optical system the camera can quickly find the point at which the image has maximum contrast which directly relates to being in perfect focus.

The system works as follows. The camera reads the voltage from a specific area on the sensor; it then moves the focus lens element a very small amount in a known direction, usually by a small stepper motor, if the voltage increases the camera again moves the lens in the same direction.

If there is another increase it will continue to move the lens and count how many steps it has taken in doing so. It will continue to move the lens until no further increase in voltage is detected. It will move the lens back to a position which is half the number of steps it took to reach the point where no further increase was detected.

However if after moving the initial step the voltage decreased it will immediately reverse the direction of movement until it detects a positive increase. If there was no change the camera would assume it was at optimum focus.

This sounds a very slow process however the camera is able to perform this operation 100 times per second and hence the name "*light speed*" focusing was marketed.

This "contrast" based detection method relies on the imaging sensor being able to detect the necessary difference in contrast in the light reaching the sensor from the subject.
If the light level is low, or the subject doesn't have any contrast differences the camera may try to hunt for focus or come up with the focus range error in red on the LCD screen.
It usually indicates what the focus distance should be for the focal length (amount of zoom) you have set on the lens.

In most instances where the camera cannot achieve focus when the subject is within the range the camera is warning you that the subject should be within is due to the lack of contrast in the subject.

It should be noted that lack of light itself doesn't mean the camera will not be able to focus.

If the subject has high inherent contrast with good delineation of edges or patterns then the camera can achieve good focus.

One of the inherent problems of this system of autofocus is where the sensor is picking up the image detail for determination of the focus point. If we have a subject with little contrast standing in front of an area which has higher contrast the camera may assume that the image is in focus by adjusting to the background contrast area and not the subject!

Number, Position and Type of Autofocus Points

Autofocus Mode Selection

The robustness and flexibility of any autofocus system is primarily due to the position and type of the autofocus points. The more points there are the more the chances of the camera determining an accurate focus point from the image falling on the sensor.

The Panasonic Lumix FZ200 has 23 such points which can be used in "23 area" method. This is particularly effective when the subject may not be in the centre of the screen, for example a flying bird.

Higher end DSLR's may have a lot more autofocus points to assist in faster and accurate autofocus.

The type of focus point also determines the speed and accuracy at which autofocus can be achieved.

If the autofocus points are "*cross shaped*" they can determine contrast in both horizontal and vertical directions adding to the reliability of detection.

Most High end cameras have many cross point areas which may be combined together to form very elaborate autofocus set ups. The Panasonic Lumix FZ200 has, as I understand it, just one central cross point focus area.

23 Area Method. This is the default method as used in the iA mode. It uses 23 points for autofocus distributed over the imaging sensor.

When this mode is selected and the shutter button is half depressed the camera will attempt to analyse the image on the sensor to drive the auto focus element of the lens to the correct position.

It will indicate by green rectangles on the display the areas it believes have the highest contrast and, therefore, are in focus.

If it is not the area you require then if recomposing the shot doesn't give the desired focus target you may need to select the 1-area method described later. The aspect ratio for the autofocus detection is the same as the aspect ratio for the image.
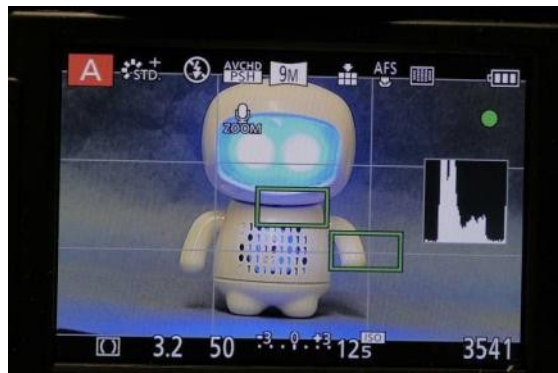
Indication of the autofocus points

Note in the above illustration the two areas which the camera has defined as the areas which are in focus and the green confirmation of focus indicator top right. Nine such areas are made by the camera from the 23 area points, which ones illuminate will depend upon the relative distances the various elements of the subject are to the camera.

Where this method may fail is in situations where the subject and background have similar contrast, the system will not be able to determine precisely what you are trying to set as the subject with a result that the wrong area of the image is selected.

A solution is to select the 1-area method as this gives you total control over the size and position of the target area for focus.
It is a simple matter then to position the target over the principal point of interest and the camera will be forced to use this area.

Single Area AF Mode

To select this mode select the last icon in the AF mode menu item and then cursor to the right ► to set both the size and position of the focus target area.

Selecting the Single Area Mode

Use the back control wheel to set the size and the position of the focus area.

Setting size and position

To reset the size back to default and position back to the centre of the display, press the *DISP* button.

If the subject is static then the two above methods are most applicable. There is, however, another mode which may help to focus on subjects that may be moving during composition and shooting – the Focus Tracking mode.

Focus Tracking Mode

Focus tracking

This mode allows you to define the target and the camera will attempt to follow the movement of the subject whilst you compose the picture and take the image.

Selecting target point

To set up the focus tracking mode first align the target area onto part of your subject which has high contrast, good definition edges and then press t*he AF/AE Lock* button. If the area has sufficient contrast the camera will be able to lock onto it. Ensure the subject is within the camera focus range by half depressing the shutter button to confirm focus can be achieved.

Target acquired icon shown

The shape of the target becomes a square with a vertical cross through it. Now acquired, if the target moves you will see the tracking icon follow the area you defined in the set up procedure. There are a number of circumstances in which tracking focus may not follow the defined subject. If the subject moves too quickly (*see the section under continuous autofocus for an explanation of this*)

or the subject is too bright, or too dark, or if the background has similar contrast to the subject then lock on may not be successful.

To cancel the autofocus tracking press the AF/AE lock button again. I will return to the face detection mode later in the guidebook when I explain the process of registering and deploying face detection.

Autofocus Styles

Autofocus styles

Now we have defined the method by which the autofocus will operate we can consider the three styles which are available to us; the AFS, AFF and AFC

AFS (autofocus single) This style is most suited to static shots or subjects which do not change focus distance during composition. This could include any moving object which is parallel to the focal plane.

This method activates as you half depress the shutter release button. At this point the camera will focus, using your preferred mode, confirm the focus by the audible beep and green indicator in the display area and will lock and stop focusing.

It will remain in this mode as long as you keep the shutter button in this position. To capture the image, fully depress the shutter release button. This single shot mode is, however, prone to focus errors when there is any subject motion which is not parallel to the camera focal plane as the subject may have moved closer, or farther away, during the time it takes to depress the button completely and the electronics/mechanics recording the shot.

This is generally termed "*shutter lag*". It's quite short in the case of the FZ200 but could still take the edge off the sharpness of your image.

Subject course

change in subject to camera distance during shutter lag time

Focal plane
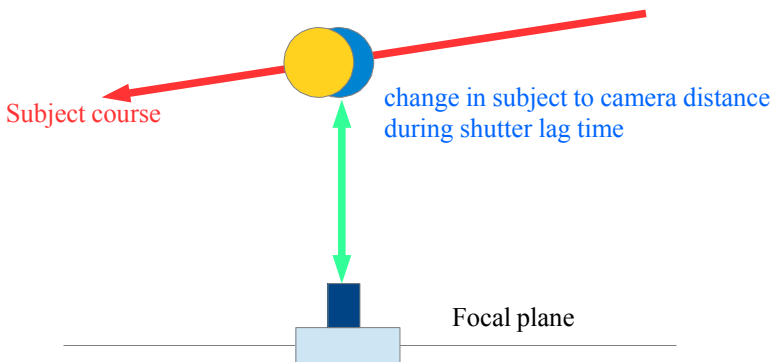
As this software algorithm does not take into consideration any subject motion if you intend to photograph moving objects it is better to consider the two other styles:

AFF (autofocus flexible) and AFC (autofocus continuous).

These styles of focus use "predictive" focus determination.

The camera computes the next focus position based upon the velocity and direction of the movement in the subject based upon trends from the previous estimates.

In the Panasonic Lumix FZ200 this calculation is made every 1/100 second. Of the two modes AFF (autofocus flexible) is cited as the one to use if there might be a change in direction of the subject, i.e. the predicted course or velocity could change.

Children or pets running might be an example here.

In contrast the AFC (autofocus continuous) style is tuned to react better to constant velocity and direction such as with auto mobiles, aero planes and trains!

AFC focus Style

Because of the speed at which the focus lens, in the lens system, can be physically moved there is a maximum rate at which subject movement can be accurately corrected.

The further away from the camera the subject is the smaller amount of motion is needed by the focus lens/motor.

The nearer the subject is to the camera more movement of the focus lens/motor is needed. If the rate of distance change exceeds the rate at which the opto-mechanical system can keep pace with the focus will not be achieved resulting in the subject being out of focus (*not to be confused with subject motion blur which is due to too low a shutter speed*)

One way to speed up focus performance is to keep the AF/AF Macro/ Manual switch on the lens barrel set to AF when you are shooting at distances beyond 2 metres.

In this configuration the lens is set to be limited at 2 metres which prevents it having to cycle all the way from 1 metre position in the AF Macro mode.

Between 1 metre and 2 metre is a long focus movement for the focus motor/lens and this takes appreciable time.

Chart Showing Subject Velocity and Lens to Subject Distance Limits
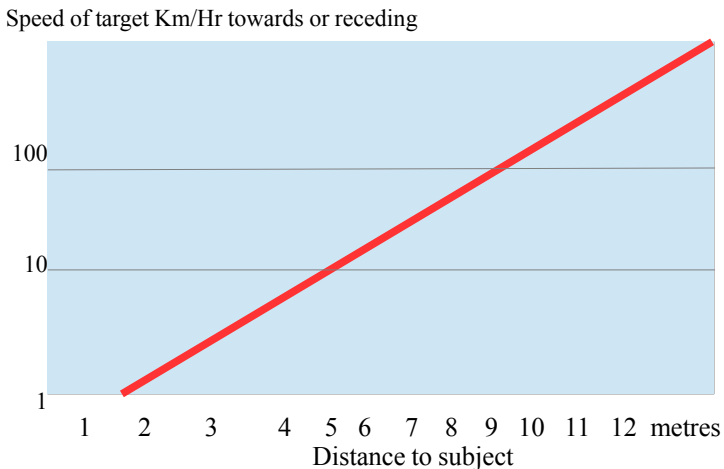
I do not have access to the actual figures for the FZ200 but the above chart is taken from a entry level dslr and shows quite clearly that at 2 metres from the subject the camera can only track a moving subject with a velocity of 0-1 Km/Hr otherwise the mechanism cannot change position quick enough to stay in focus.

I guess you can appreciate now that tracking flying birds at close range is probably beyond the rate at which the FZ200 can react.

Actual tracking speed will also depend upon how erratically the subject is moving, the subject contrast, lighting conditions and the focal length of the lens. It might also be apparent that with this type of focusing style considerably more battery power is consumed during the period of time the shutter button is being held half depressed and you are tracking your subject.

Manual Focus

The implementation of manual focus is somewhat of a mixed blessing. It's a worthwhile addition to the functionality of the Panasonic Lumix FZ200 however the mechanics of its control can border on frustration at times. In video mode it is almost impossible to achieve a manual "focus pull" successfully.
It does however retain the excellent visual indicator scale of the predecessor range of bridge camera which not only shows the actual focusing distance but also the amount of DOF (depth of field) at the current focal length (zoom setting) of the lens.

The Manual Focus Scale

The process of engaging manual focus begins with sliding the AF/AF macro/Manual slide switch on the side of the lens barrel to the Manual position.

MF Slide Switch

Once the switch is set to this position the camera will allow you to set the focus distance by rotating the back control dial, moving it to the left moves the focus distance closer to the subject and to the right farther away.

The MF icon on the LCD screen at this point will be highlighted in yellow to indicate that the back control dial will change the focus.

The Manual Focus Icon

As you begin to adjust the focus position the image on the LCD will show the focus scale and, if you have MF assist turned on in the set up menu, you will get a magnified view of the current area indicated by the white open rectangle.

MF Assist in Setup menu

The area under the target will be magnified when the back control dial is rotated (if the MF assist is enabled). Clicking the switch inwards will alter the magnification to x4 to give a highly magnified view of the image. A second click gives x10. Rotate the dial until the image comes into focus and then continue to rotate it past the focus point and then rotate it back to the point of focus.

Area to be magnified

You can use either the back control dial or the left and right navigation keys ◄► to move the focus point. To alter the area under the target press the Menu/Set button and then use the 4 navigation buttons to move the target over the image

The Magnified View

Positioning the area to be magnified by using the 4 navigation keys, the image will magnify as you rotate the dial.

Positioning the target area

The actual focal distance will be indicated by the position of the yellow bar on the focus scale.

Depending upon the distance the subject is to the camera, the current aperture setting and focal length of the lens (*zoom setting*) the length of the yellow bar will indicate the actual DOF (*depth of field*) that the image will have when the picture is taken.

The wider the zoom is set (shorter focal length) combined with a smaller aperture (bigger f-number) the more DOF will be captured. That is to say more of the subject from front to back will be in focus.
Conversely if you want very shallow DOF you will need to use a higher zoom setting (longer focal length) and a wider aperture (smaller f-number).
By positioning your camera as close as you can to your subject and at the same time keeping the distance from the subject to the background as far as you it is possible to achieve some very nice portraits or still life studies with a beautifully blurred background.

Focus position and DOF displayed

Here in this illustration the focal distance is 1.3 metres and the DOF extends from this distance to infinity. By setting the end of the yellow bar against the infinity mark and using a wide angle setting you can shoot without need to focus - allowing you to concentrate on the composition of the image.

(Tip)
To prevent these settings from being lost when the camera "sleeps" you can enable two settings in the "tools" menu.
Zoom resume and Focus resume.

So if the camera enters sleep mode you can press the shutter button to bring it out of this mode. The camera will resume exactly to the same zoom and focus positions as previous to when it entered the sleep mode.

Background blur or "Bokeh" from shallow DOF

The normal operation of the Zoom slide switch on the side of the lens barrel can be programmed to act as a manual focus lever. This can be set up in the "tools" menu.

A more satisfactory way to achieve this is to program the functionality of the Fn3 button to select the operation of this switch to be either Zoom or Focus operation. I will discuss the programming of the function buttons later in the guidebook see page.

During the manual focus mode, the focus button on the side of the lens will force the camera to do an automatic focus using your defined focus point. This is useful for quickly setting the camera to the approximate focus position.

You can then use the control wheel/navigation buttons to fine tune this position.

So we can see that the manual focus facility is very useful when any one of the automatic focus methods fails to identify the subject from the background. This can either be through lack of subject contrast, the subject being too small or from very poor light on the subject.

Continuous shooting modes

With the continuous shooting modes you can effectively shoot with reduced image size up to 60 frames per second. Full resolution images are recorded at either 12, 5.5 or 2 frames per second.

At the full 12 fps burst rate you can capture up to 12 images in one burst whilst at the slower speeds you are limited only by memory buffer.

To achieve the 12fps stated performance with full resolution fine quality JPEG images you need to use the class 6 SDHC memory card specified for video. Ideally this mode is used for very short bursts of image capture.

When you shoot at the 5.5fps single AF mode you will find that you can shoot around 12-15 images before the actual speed drops dramatically as the camera buffer fills and empties to the SDHC card.

The speed drops to about 2 fps after the initial 2-3 seconds of 5.5 fps burst.

In the single AF mode exposure and focus are fixed for the first exposure of the burst sequence. This means that if your subject is moving towards, or away from, the camera focus may not be maintained.

This will depend upon the lens aperture and focal length as this will determine the depth of field available during the burst sequence.

If you select the continuous autofocus mode the camera is forced to focus for each image.
You can also use manual focus and this speeds up the first image capture as the camera does not have to autofocus!

Burst mode is enabled by depressing the Burst Mode Button on the top plate of the camera

Burst 2 fps with or without AF.

Burst 5.5 fps with or without AF.

Burst 12 fps Single AF only.

Burst 40fps, lower image size, electronic shutter and single AF only.

Burst 60fps, lower image size, electronic shutter and single AF only.

Burst mode with flash enabled, 2M image and single AF only.

For the higher burst rates of 40 and 60 fps the mechanical shutter is replaced with an "electronic" shutter. The camera is in effect recording in a video mode with the exposures being recorded during a progressive sensor scan. This can lead to distorted images if the subject is moving, or the camera is panning with the subject movement. The electronic shutter can be used to reduce camera/tripod shake during exposure.

The image size is reduced in order that the camera can fill and empty the camera buffer to the SDHC card efficiently.

Auto Exposure and Auto Focus Lock

This is useful when you want to take a picture of a subject outside the AF area or the contrast is too strong and you cannot achieve appropriate exposure.

To use as the AF/AE LOCK button, set AF/AE LOCK /Fn2 in the Setup menu to AF/AE LOCK. This should however be the camera default setting.

The options are:
AF Only the focus is locked. AFL and focus indication are displayed.
AE Only the exposure is locked. AEL, aperture value, and shutter speed are displayed when the exposure is adjusted.
AF/AE Both the focus and exposure are locked. AFL, AEL, the focus indication, aperture value and shutter speed are displayed when the focus and the exposure are optimised.
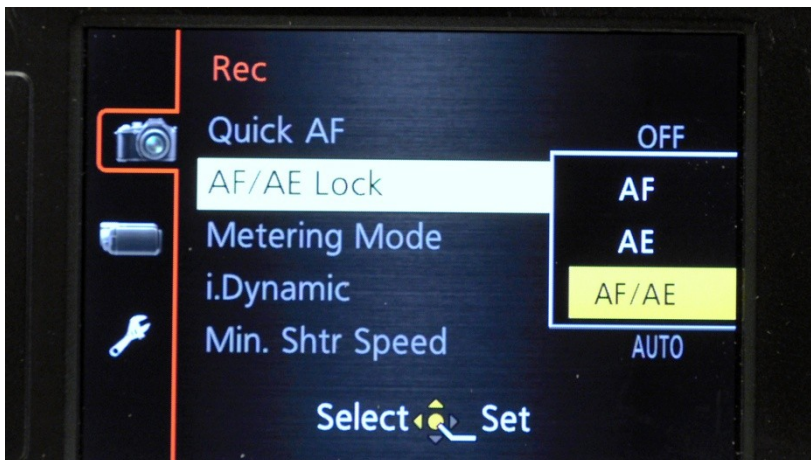
To use this feature:
> Aim the AF area at the subject.
> Press AF/AE LOCK button to fix the focus and exposure.
> Move the camera to compose the picture and then press the shutter button fully.

The setting is cancelled by pressing the AF/AE LOCK button again.

When AE only is set, after pressing the shutter button halfway to focus, press the shutter button fully to make the exposure.

Semi-automatic Exposure Modes

We have seen how useful the iA mode is to new users to the Panasonic Lumix FZ200, however as we have seen as this relies on the camera processor deciding which one of the 8 automatic scene modes to categorise your image in order to produce a correctly exposed image. If it fails to assign a category it defaults to what effectively is the P or "program auto mode".

In the P mode the camera will decide how to make the exposure, not by analysing the scene type but, by analysing the information coming from the metering facility of the camera sensor.

It will set an Aperture and Shutter speed according to the amount of light being detected by the sensor and the value of the ISO, if you have set it manually or if you have the ISO set to the Auto ISO setting. The P mode will give you an exposure even if you are in the i-ISO (intelligent ISO mode) however you will not be able to access the most important feature that the P mode has and that is "Program Shift".
Program Shift allows you to change the combination of aperture and shutter speed set by the camera.

P mode is activated by turning the top mode control dial so that the P is aligned with the index mark on the top plate.

The LCD screen showing the camera set to the P mode, and after the shutter button has been half depressed and then released. (*note the aperture and shutter speed combination in yellow highlight*)

The Program auto mode

When you select the P mode and then when you point the camera at the subject and half press the shutter release button and release it the camera will display the aperture and shutter speed, highlighted in yellow.

This will now allow you, through rotating the back control dial, to select new combinations of aperture and shutter speed. By default the camera will set the widest aperture (lowest f-number) to allow a reasonably fast shutter speed depending upon the ISO being either set manually or by the camera itself.

It is really your choice of how to adjust this combination, if indeed you feel that the choice of aperture, or shutter speed is inappropriate for the scene you are photographing.

For example you may want maximum depth of field in your image. To achieve this you need a small aperture (larger f-number). Or you may want to be photographing a sports scene which requires a faster shutter speed to stop any subject motion blur.

To set the aperture (or shutter speed) to your requirement you simply turn the back control dial until you see your desired setting.

The program shift screen

In this illustration, on turning the dial to the left the icon of a "P" with a double headed arrow is displayed – indicating we have a "shift" in operation. If we turned the dial to the right we would see the aperture which was the next increment from the initial display depending upon your aperture increments.

program shift

Turning the control to the right alters the initial value of F2.8 and, as shown, the value is F4.5.
You can see the shutter speed has decreased (longer) as a result of less light reaching the sensor due to the decrease in aperture size.

The effect of program shift, through allowing you to preset the aperture that the camera will use in this mode, is remembered by the camera until you either turn off the camera or, turn the back control dial back to the original setting. This will be at the point where the double header arrow symbol disappears. Even if you temporarily change exposure modes and then at some point return to the P mode, the previous shift aperture value is retained.

For some users the P mode becomes the next logical choice of exposure mode after migrating away from the fully auto mode (iA).
In using this mode, simply letting the camera determine exposure solely based upon your choice of metering style and method, can bring a significant yield in better quality images.

Again if the metering circuitry doesn't identify the subject brightness correctly then it is a case of just pressing in the back control dial to change the adjustment to the exposure compensation scale which will also turn a yellow color as you gain control of it. Typically these are going to be backlit shots or those where the ratio of subject to background contrast is very high.

If you find yourself constantly adjusting the combination determined by the camera it may be worth using the Aperture priority mode in place of this method.

Aperture Priority Mode

Aperture priority mode again calls upon the metering of the scene by the camera however you will set the aperture that you want to use for the images.
You may choose this aperture because of a need for a particular DOF (depth of field). For example you may select a small aperture for capturing the most foreground to background sharpness in a landscape scene or to a wide open aperture to shoot a portrait with the background out of focus thus emphasising your subject in the image.

To use aperture priority mode, again rotate the top mode control dial to align the A against the index mark on the top plate of the camera. You will see confirmation that you are in this mode by A symbol displayed in red at the top left hand side of the image shown on the LCD display.

The confirmation of the Aperture priority mode indicated by the red A icon.

Control of the aperture value is accomplished by clicking in, repeatedly, the back control dial until the aperture value becomes yellow. At this point the aperture value will be controlled by rotation of the wheel.

the Aperture priority screen

Aperture priority mode uses, as with the P mode, the metering style and mode choices you have previously established. If the recorded image is too light, or too dark, exposure compensation can be used to correct it.

Shutter Priority Mode

Shutter priority mode is most useful when you require to set a specific shutter speed in order to arrest motion, particularly motion in the subject. An example would be at a sports event or in nature photography capturing flying birds (assuming you can lock focus!)

Shutter mode is engaged as before by rotating the top mode control dial until the S symbol aligns with the index mark on the camera top plate.

Again exposure compensation can be used to correct for any images which are light or dark due to metering errors.

Manual Exposure Mode

Manual mode unleashes all the creative control of the Panasonic Lumix FZ200. It allows you, the user, to take full control of all the picture taking decisions.

You will still use the camera metering system to determine exposure however you could also use an external meter to evaluate the exposure and set the camera controls accordingly.

From the exposure triangle you saw the relationship of Aperture, Shutter speed and ISO to interact to give the correct exposure. In manual mode

95

you have full and independent control over each of the three parameters.

As with setting any exposure mode manual exposure (M) mode is achieved by turning the top mode control dial until the M is aligned with the index mark on the top of the camera.

The key elements are aperture, shutter speed and ISO. Let's take a look at them in closer detail.

The Full F-Stop Range For the FZ200 lens

Aperture, or the size of the lens diaphragm, is one of the controlling elements in our Manual exposure. F8 is the smallest aperture that is available with the FZ200 camera. The widest aperture is F2.8.

Remember the primary purpose of the lens aperture is to reduce the light reaching the sensor from the lens. Each full aperture step reduces the light by a factor of 2. The diagram above shows the full F stop range of the FZ200. In the camera we also have intermediate 1/3 f-stop increments to allow more precise control of exposure, e.g. f6.3, f7.1

In traditional bridge cameras, or telephoto zoom lenses, as you change the focal length of the lens by using the zoom lever, or rotating the barrel, you normally have a decrease in light reaching the sensor due to the optical design of the lens. Usually the lens may be f2.8 at the wide angle zoom setting however as you approach full telephoto focal lengths this aperture could have changed to f5.6 or even f6.3.
This equates to at least a 2 stops or 4 times reduction in the light available at the sensor.
In practical terms when you are shooting at these extended focal lengths you will either have to increase your ISO setting or reduce the shutter speed by the same amount in order to keep the same exposure as you had with the focal length set at the wide angle position.

In the Panasonic Lumix FZ200 the lens has a "constant" aperture of f2.8 throughout the entire zoom range. So no light loss and no increase in ISO or a reduction in shutter speed is needed! This can be a major advantage for use with wildlife photography where light levels are usually quite low.

Let's look at Shutter speeds. The shutter controls the amount of time the light is allowed to project onto the sensor surface from the lens.
From a practical point of view we need a value for this time which allows us to capture images hand held without camera shake.

Before days of lenses with optical stabilisation built in there used to be a "golden rule" that shutter speed should always be 1/focal length. So for example if you were using a 600mm lens the minimum shutter speed you would have been using would have been the nearest shutter speed to 1/600 sec. (i.e. 1/640 sec.)
The agreed international standards for shutter speeds are:

1/1000 s, 1/500 s, 1/250 s, 1/125 s, 1/60 s, 1/30 s, 1/15 s, 1/8 s, 1/4 s, 1/2 s, 1 s. 2 s. 4 s. etc.,

Consider the 1/1000 value; this means that the shutter speed is open for one thousandth of a second. Just like f-stops, there is a relationship between successive values.
For each shutter speed in the table above, the shutter remains open half as long as the one above it. For example 1/125 sec. is half as long as 1/60 sec. In The FZ200 the shutter speeds selectable also include intermediate values which equate to 1/3 EV of f-stop increment.

Now with optical image stabilisation offering between 3 and 4 stops advantage we can very easily shoot with our 600mm lens at 1/60 second.

However as the OIS (optical image stabilisation) compensates for any camera movement (hand shake) it does not arrest any subject motion. So whilst the camera can be used at 1/60 second it is likely that our subject will have motion blur if there is any movement at all, because of the magnification of the lens at this focal length.
The final element in the parameters controlling exposure is ISO.
As we saw previously in my discussion on image sensors ISO is the overall measure of the "cameras" sensitivity, not just the sensor.

Again, like shutter and aperture scales, there is a relationship between successive numbers in the ISO table. Higher values relate to higher camera sensitivity.

Higher sensitivity allows us to capture low light level images with hand held shutter speeds of 1/15 second or so!

100, 200, 400, 800, 1600, 3200: are the full f-stop equivalent values.

Once again the relationship is half, or double, when you go from one step in the table to the next.

With the FZ200 it is possible to set the increments that will appear as you adjust ISO value to match the shutter speed and aperture 1/3 f-stop increments. This is done in the "tools" set up menu.

If you set this incremental 1/3 step value it, does give you finer control of ISO setting.

Now we know the relationship of the values in the ISO, Aperture and Shutter speed tables we can apply this knowledge to our manual exposure mode.

When we looked at the exposure triangle we saw the need to identify the one component in the equation which had the most impact on our photographic image.

If we wanted the lowest image noise level then we would set the ISO to the lowest value as we know this reduces image noise.

If we wanted a very shallow DOF for a portrait we would choose a large aperture (small f-stop number like F2.8).

If we wanted to capture silky waterfalls we would set a very long shutter speed in the order of 1-2 seconds or more.

So let's take the example of the capturing a silky waterfall. We understand the need for a long shutter speed of perhaps 1 second.

We also want the lowest noise in our image so we must select as low an ISO value as we can.

So, with the camera in hand, we adjust the ISO to 100, set the shutter speed to 1 second but what about the aperture? What value do we set here as we don't have the automatically adjusted settings as with the P, A or S semi-automatic modes.

Come to the rescue the camera's inbuilt exposure meter, the same one which is used by the camera in the auto, or semi-automatic modes.

When we are in the manual mode, the same metering modes are used, full area, centre weighted or spot metering. We decide which one depending upon the subject.

For our waterfall we might select full area metering or centre weighted as both will give the same overall exposure reading.

If we take a look at the display on the LCD screen, at this time, we will see the exposure meter and the current exposure displayed.

The meter is displayed, lower centre of the screen.
The scale represents the amount of under to over exposure with a range of plus or minus 3 EV (f-stop).

You can see the aperture value of f3.2 and a shutter speed of 1/500sec, ISO 100.

Exposure meter scale
To adjust the camera to give the correct exposure with our shutter speed set to 1 second (as illustrated below) we need to push the back control dial inwards until the aperture numbers change to yellow, indication we have control of the aperture setting
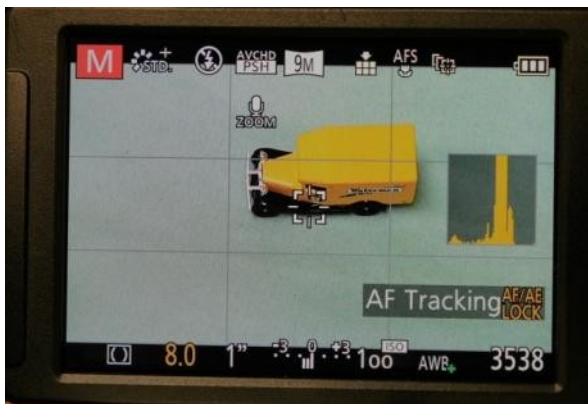
Here the aperture has been adjusted to f8 and the exposure meter is now indicating that we are just 2/3 f-stop under exposed.

To get the 0 EV value the aperture needs to open up to f7.1 as shown next.
Adjusting f-stop

Here the meter is showing perfect exposure i.e. it is at 0EV value. Unlike the semi and automatic modes there is no exposure compensation control wheel. It is done by setting the exposure meter to the value of under or overexposure needed by using the aperture or shutter control.

aperture

With ISO set, the exposure is balanced using a combination of aperture and shutter speed giving the 0EV reading on the meter scale

shutter speed
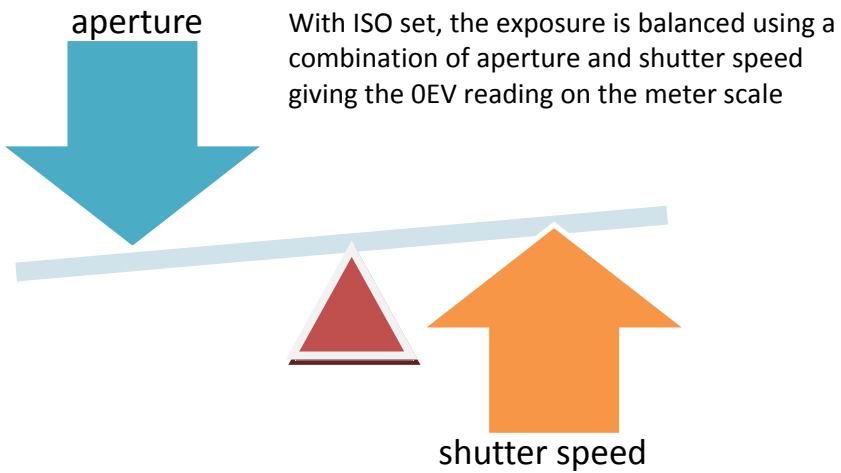
Using the manual exposure mode allows you to take full control over your image exposure.

We have now taken a look at the full and semi-automatic modes, and concluded this section with a look at full manual control. I want to consider next the effects of photostyles on image quality.

We have seen all the shooting modes available on the Panasonic Lumix FZ200 camera; let's take a look at some of the other "REC Mode" menu options which can be adjusted in these modes.

Other REC Mode Functions

In the set up mode for stills photography there are a number of additional parameters which can be enabled, or disabled, depending upon the type of photography employed.

Quick AF mode

Quick AF.
In an attempt to speed up the autofocus of the camera Panasonic employ the Quick AF function. If this is enabled as soon as the camera detects that it is no longer moving, for example if you bring the camera up to your eye, then as soon as you stop, the camera starts to focus – even before you have half depressed the shutter button.

This may help in some situations, however it also very hungry on battery power. It will constantly be attempting to focus every time the camera detects that there is no camera movement.

Even more power depleting if you have focus mode set to continuous autofocus – it could end up continuously focusing whilst you set your camera down whilst you have a coffee!

Unless you are seriously concerned about the few seconds it might takes the camera to fix and lock exposure and focus I would turn this feature off to reserve battery power.

i.Resolution.
Is a further attempt by Panasonic to increase the apparent "sharpness" in the JPEG camera image. It has the two options i.Zoom and ON. In the i.Zoom mode it can be used to gain increased digital zoom at what Panasonic refer to as minimal loss of image quality.

i.Resolution setting

Confusingly, Panasonic call this "Extended Optical Zoom". They claim this to be equivalent of an increase in optical zoom for the reason that the "cropped image on the sensor" provides a final image quality that shows no deterioration in print quality. The reason this occurs is for the fact that if you reduce the image size you require, effectively less pixels. So from a 4000 x 3000 pixel sensor if we require an output that is say 8M (3264x2448 pixels) rather than a software down-sampling they chose to create this image from the central area of the 4000x3000 pixels.
The effect is as though you had increased optical zoom.
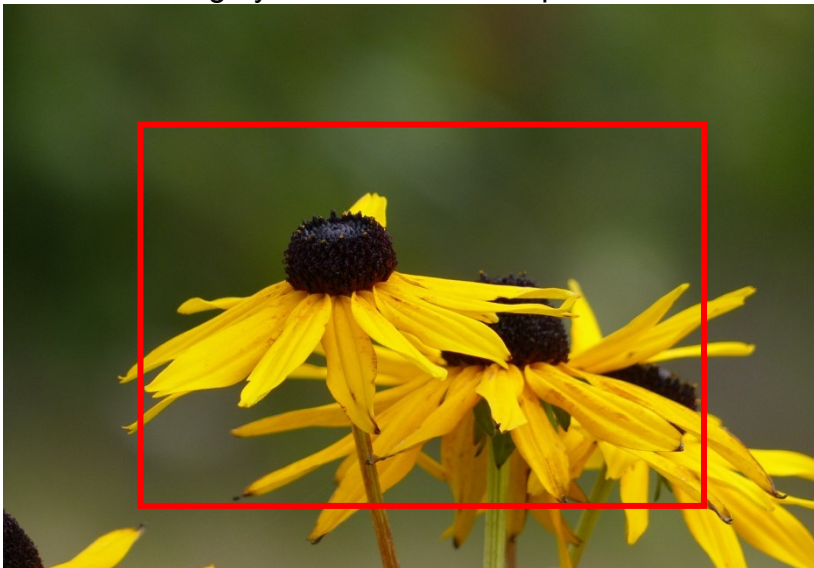
i.Zoom or "Extended Optical Zoom"

The "Digital cropped image"

From the area in red outline in the illustration the resulting image is produced. It has the same pixel density as a full sized image size therefore the resulting maximum print size is much smaller. (*divide image width x 300 to get actual print size for normal photo prints!)*

If you look closely at the set up menu it gives you a clue!
At 12M 4000 x 3000 pixel, A2 print 16 x 20 inch
At   8M 3624 x 2448 pixel, A3 print 11 x 14 inch
At   5M 2560 x1920 pixel, A4 print 10 x 8 inch
So what you are getting is a smaller file size only, with the applied digital crop. You would get the same result if you physically printed the full size 16 x 20 inch print from the 4000 x 3000 image and the guillotined it to the 11 x 14 size. The results would be identical!

It is however not the same as "digital zoom". Digital zoom works by pixel interpolation – method by which when a digital image is enlarged the scaling software "guesses" mathematically what the pixel colors would be for the area between the original image and the enlarged one. Effectively the image is "made up" and hence always looks slightly "pixelated" where these extra pixels have been created.

If you limit the amount of digital zoom to 1.5 and if you are only using the output for small prints, HDTV or web images they will be of sufficient quality as seen above. It is a convenience factor only though as this could always be done in post production editing.

The other feature of i.Resolution, if not set to i.zoom, is to apply sharpening to only those areas of the image where there is large amounts of contrast changes – i.e where there are plenty image details.

In large areas of equal tone such as in some skies and open landscapes the software does not "sharpen" these areas. It applies local edge sharpening to the image which gives the appearance of extra resolution or sharpness. Basically the image resolution hasn't changed as that is a physical combination of pixel density and lens resolving power. What you are seeing is an apparent increase in resolving power due to increased image contrast.

From my own experience, and from other comments on camera forums, it would appear that this can either;
Go un-noticed.
Make the image worse by showing pixelation in skies.
Over sharpen causing white halos on fine detail such as branches in trees and fabric on upholstery.

As local contrast can be applied in post processing, where you can control the degree and location of this applied effect, it might be wiser to leave this turned off rather than risk image degradation.

i.Dynamic

The i.Dynamic menu option

The i.Dynamic feature is a software process which attempts to increase the range of brightness captured by the camera. There are 4 settings of Low, Standard, High and Off. It is similar to HDR as it raises shadow brightness and lowers highlight intensity. If you use i.Dynamic and have ISO set at 100 the camera will raise the ISO to 160 to achieve the result!

Chapter 3

How Photo Styles Change Image Quality

About photo styles

The photo styles appear as the very first menu item when you enter the REC Setup menu in any of the semi-automatic or manual exposure modes.

These offer the user a way of "fine tuning" the way in which the camera processes the image from the sensor and saves it as the JPEG image file on your memory card.

There are 6 photo styles available, plus the option to save a "custom profile" made from any of the other 6 profiles:

Standard
Vivid
Natural
Monochrome
Scenery
Portrait

With each of the photo styles there are 4 parameters which are user definable:

Contrast
Sharpness
Saturation
Noise reduction

Each of these parameters can be set to one of 5 values from -2 to +2

This gives the user some 6x4x5x5x5x5 = 15000 options!

Do we need them all?

The use of photo styles really comes down to the question of what the purpose of the final image recorded on your memory card is going to be used for.

If you are going to use the image directly on a website, social media site or for regular sized photographic (or home photo printer) prints then it makes sense to have the camera do all the processing for you so that you end up with a file which will require no further work, or post-processing as it is normally known.

If this is the case then, using the photo styles can help you achieve this step very easily.

If however you want to post process your images and be able to see the effect of increasing contrast or saturation for example, then there is also a case of using the photo styles setup specifically to give you images which will post process more easily.

If however you want the highest quality image possible from this camera then you need to consider switching to a workflow which uses the camera RAW file, and then do all the post processing yourself.

Unless you do need this it is extremely time consuming to process each individual file unless the images are of a similar nature in which case thay can be "batch" processed using a common setting.

For the majority of users, setting up the Standard photo style with some slight customisation will provide JPEG images which are almost identical to the same RAW image processed.

Photostyle Setup

Photo Style Setup

Photo style options

By selecting the photo style option in the menu and pressing the navigation key to the right ► you will see the first of the photo style choices – Standard. Keep pressing the navigation key and you will cycle through the other 6 options.

In the illustration above you can see the 4 parameters to which you may make the adjustment. From the top: Contrast, Sharpness, Saturation and Noise reduction.

If you use the navigation down key ▼ you will enter the adjustment for the selected parameter as shown below.

Parameter adjustment

The back control dial or the left and right navigation buttons can be used to adjust the value.
The centre value is the default setting. Go to the left to reduce the control's effect or to the right to increase it.

These 4 parameters affect the image the same way in all of the 6 photo styles except in the case of the Monochrome style where the Saturation slider can be used to give a sepia effect if you set it below 0 or a blue tint if you set it above 0. A very useful feature if you like to capture these toned images.

After many, many, tests of using these photo styles I have adopted the Standard photo style as my "shoot anything" photo style with the following adjustment to the parameters.
Sharpness +1 and Noise reduction -2.

For ready to use JPEG files the very slight increase in sharpness and the removal of the noise reduction setting (which usually adds blur to mask the image noise) produces very acceptable images. In a high contrast scene it is useful to reduce contrast to -2.

In a scene with flat or low contrast lighting push the slider up to +2.

A very useful addition to setting up the parameters of the photo styles is the ability to register a set of parameters into the Custom photo style.

So in my example of a low contrast scene you could set the contrast to +2, use the cursor to move down to the "Custom Setting" option and save this new setting there.

Reset the contrast back to 0.

Now if you encounter a scene where you want to have increase contrast just select the "Custom" photo style from the menu and you are ready to shoot.

Return to the Standard photo style when you have done.

Standard photo style
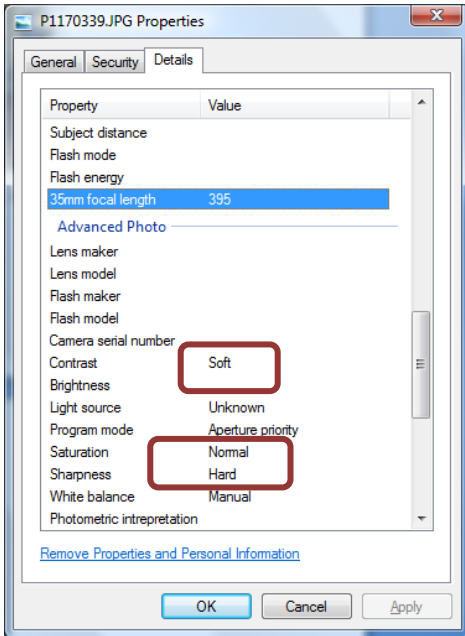
The information regarding the image properties can be viewed; if you are using a Windows OS based pc, via the file properties dialog box under the Details Tab.

Here in the illustration is the exif (exchangeable information file) for one image taken using Standard photo style with -2 contrast,) Saturation and +2 Sharpness.
It also gives you information about ISO, zoom, shutter speed and aperture used.

The differences in the effect of -2 to +2 Contrast change

Contrast -2

Contrast +2

In Camera Post Processing of Images

With the Panasonic Lumix FZ200 it is possible to alter and create a copy of an original image in the camera without destroying the original image in the process.

This is done by using "in camera" editing.

You can have the camera automatically "retouch" the image or you can select from a range of creative retouch options to create totally different results.

Auto retouch

To edit the images already in the camera on the SDHC card put the camera in the PLAY mode and navigate to the image you wish to edit

In PLAY mode select the image to edit. Press the UP navigation key ▲

For Automatic correction select Auto retouch and press Menu/Set button

Select ON from the menu choice
And press Menu/Set
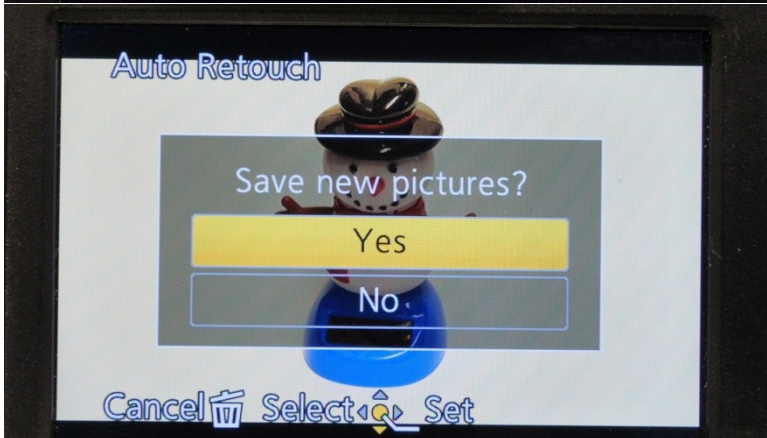
A new copy of the image is created and saved on the SDHC memory card.

The "auto retouch" option will correct slight exposure and white balance errors and tries to bring out any detail in shadows.

When you save the new image it is automatically displayed.
Now you can then move to the next image that you wish to edit or perform some "creative" retouch on the displayed image.
Creative retouch offers the following choices;

One color► Star burst ► Soft focus ► Miniature effect ► Toy camera ► Cross process ► High Dynamic ► Impressionist art ► Black and white ► Sepia ► Low key ►High key ► Retro and Expressive color

To open an image for creative editing, as before use the "Up" navigation key▲ to select Retouch and then select "Creative Retouch" from the menu and then complete the action by pressing the Menu/set button.

Creative retouch

Select the required image and use the UP button ▲ to open the retouch option.

Select Creative Retouch and then Menu/Set.

Use the Up navigation key to scroll through the options until you reach the effect that you wish to create.
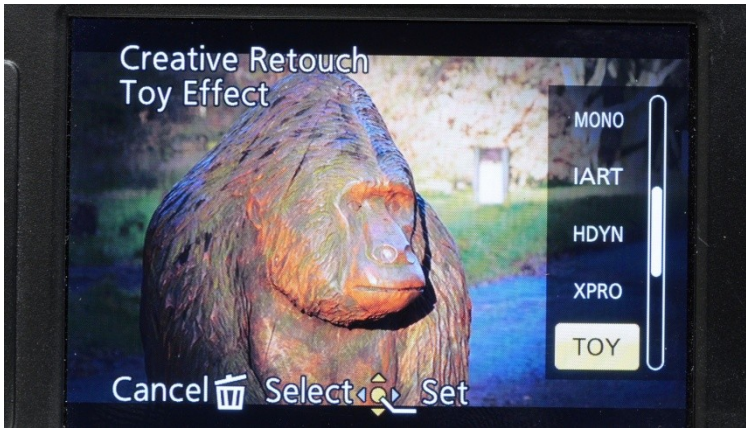
The screen will show a preview of the finished image after the effect has been applied and any effect based options are shown

For example in the Toy camera effect you can apply a color tint to the final image.
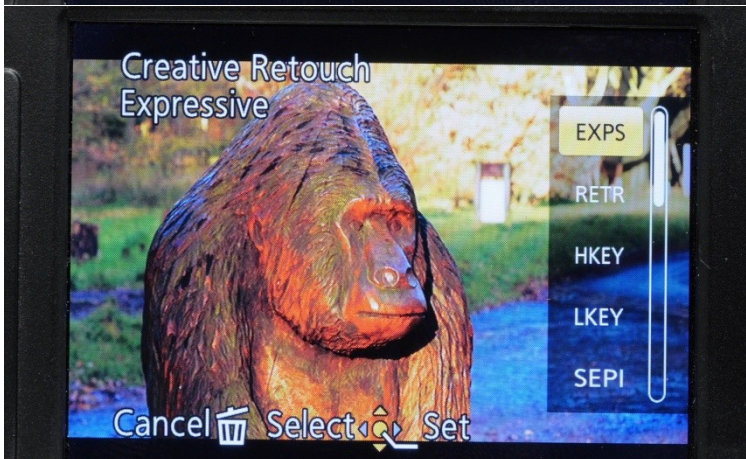
Any effect can be "undone" by using the Cancel button before an image is saved.

Samples of In Camera Creative Editing

Original image

Toy camera

Mono

Sepia

Expressive

So with very little effort you can shoot and edit an image in camera and produce some very pleasing results – often by combining two or more effects on top of each other.

The advantage is that the original file is never changed so it is always available for re-editing if you so desire at a later date.

You can only edit camera files and not files loaded onto the SDHC card.

Post Processing JPEG Image Files

All digital image files benefit from some degree of post processing to achieve a better final image quality. Camera designers tend to err on the cautious side when applying things like sharpening filters in processing the camera JPEG file.

Because the process of producing the JPEG image is a "cast in stone" process if the files were to be over-sharpened, in camera, resulting in what are referred to as JPEG Artefacts and sharpening halos were have degraded the image and this cannot be undone (unlike RAW which can).

In post processing then, we have a degree of control over how we sharpen (using different techniques depending upon subject).

Sharpened JPEG Image

Most people associate photo editing with Adobe® Photoshop or similar program but there is an alternative and it's free and it came on the green colored disc that you probably ignored when you unpacked the camera.

It's Silkypix® and is a really easy program to use and has both Windows and MAC OS versions included on the disk.

You may have thought it only a RAW editing program, however as I will show you now it is a very powerful JPEG editor as well, feature rich and superb results.

The only negative about this program though is that there is nothing in the way of a written manual (– just a link to an online help page-) to show you how to use it.

With a few guided steps you can have results in no time!
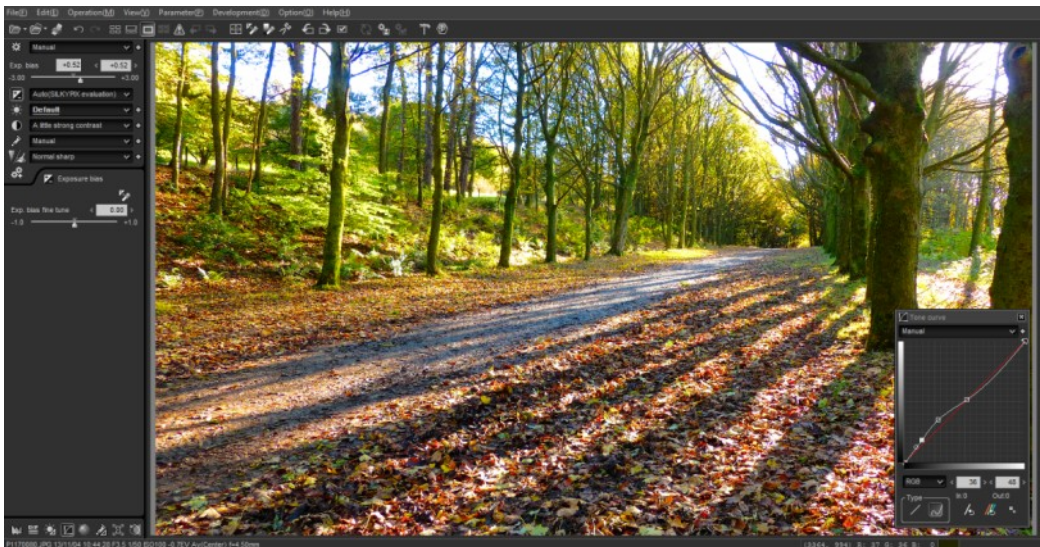
The Silkypix® Photo editing program with JPEG file opened for editing

Open the Silkypix program and then choose open file: you can browse with a neat preview of the file you select, click OK. (This will only work for images created with the Panasonic range of cameras!)

Silkypix® File open dialog
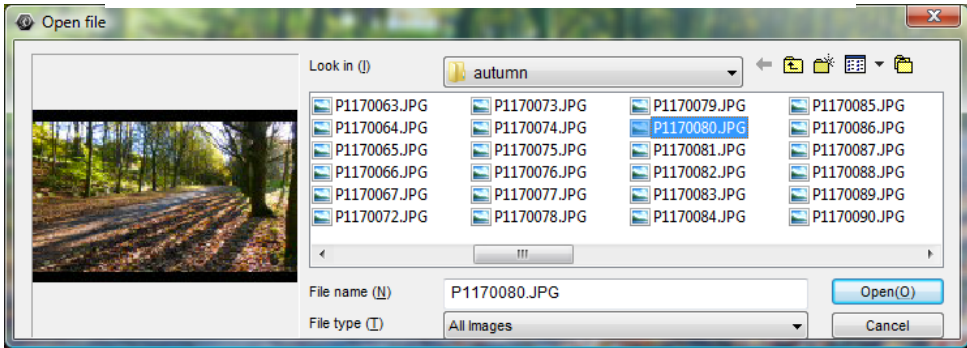
The program will open the file and apply some "automatic" adjustments to your image.

In a lot of cases you probably do not have to manipulate the image any further, you can go ahead and save the processed file.

If however you want to make any changes then you can use the menu dialogs to make the desired changes.

The additional processing options available to you.
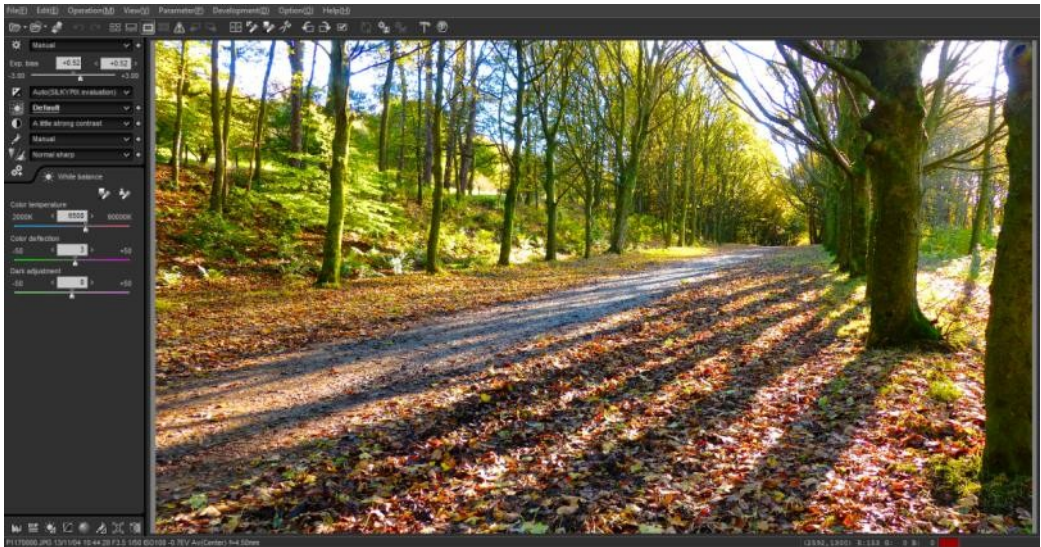
The file opened for editing
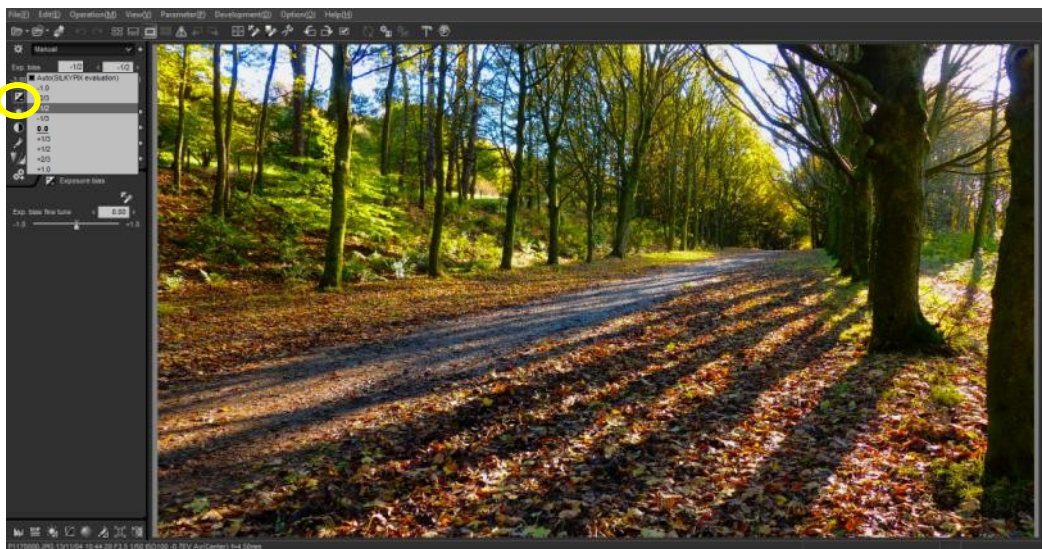
Adjust Exposure (circled) hover mouse over the values to see screen preview

The controls all give "real time" preview on screen of the final result. Just hover the mouse cursor over the values to see how it will look. In the above illustration I have the mouse hovered on -1/2 adjustment value and you can see it has adjusted the exposure compared to the original file (above).

If you are familiar with using tone curves you can adjust highlight, shadow and mid-tone with the curves dialog screen.
Or you can use the presets available under the contrast setting.

Lowest contrast
Low contrast
A little low contrast
Average contrast
A little strong contrast
Strong contrast
Strongest contrast
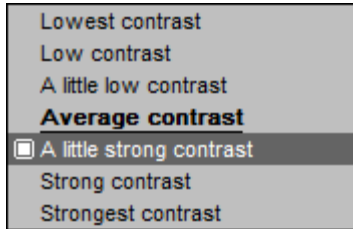
If you think the white balance needs adjusting, again either use the auto or manual control to do this.
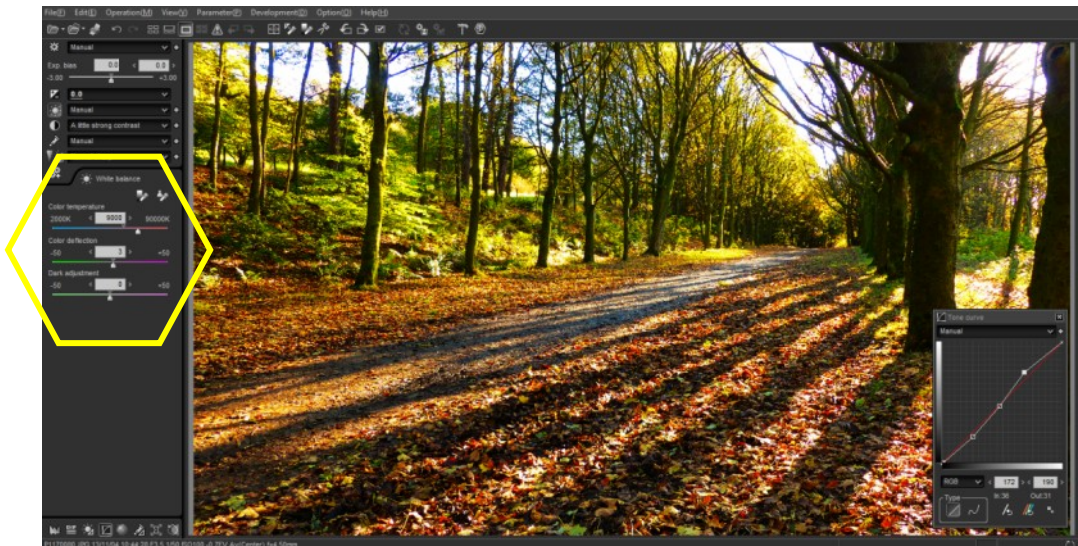
Manual White Balance adjustment

White balance has already been set by you (or auto by the camera) so you can only make relative adjustments here. However it is good for fine tuning or adding a color tint to the image.

No sharpness
Noise reduction priority
Faint sharp for noisy scene
Normal sharp
Strong sharp
Emphatic sharp
Exaggerate sharp
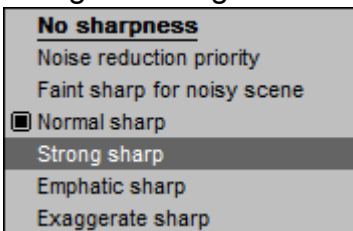
The final adjustment you may want to make is sharpening.
Again the results are previewed on screen.
All that remains is to click Development to save the file either over-writing or re-naming it.

121

Here is the original JPEG and the image after I made adjustment with Silkypix®

The Original JPEG Image

After adjustment of contrast, color temperature and sharpness

Development of Camera RAW Files

A RAW file is not an image file per se, it requires a de-mosaic process to turn it into an RGB image.

Camera RAW files provide the highest image quality that you can get using the Panasonic Lumix FZ200 camera.

There are a number of reasons for this.

They provide much more color information - 16K color steps per channel compared to just 256 in JPEG files

Have no camera based white balance applied. You can set the white balance to a more precise level if required.

Have no sharpening or noise reduction applied so there is no lack of image information – you control it in post processing.

They can be re-edited using different processing set ups to produce a new image without any further loss of image quality.

They can generate 16 bit files for exporting to other photo editing programs from within the RAW processing software.

The only disadvantages for some people may be the file size, It can be over 12MB in size as it is uncompressed data, and they can only be "developed" in programs designed to "open" this file structure.

Adobe® Lightroom is perhaps the most commonly used program for this, either as a standalone application or as a "plug in" for Photoshop® or Photoshop Elements® - the ACR plug in.

However, Panasonic have given you SilkyPix® in both the MAC and Windows™ OS's to "develop the Panasonic CR2 file. It is a very convenient way for you to experiment using the RAW files and witness just how much more information can be extracted from the camera image. Once you "develop" your image it can be saved as a regular JPEG file or saved as a 16 bit TIFF file so that it can be used in your regular photo editing software to further enhance it with things like local adjustment layers, cloning out detail etc.

We have seen how existing JPEG images can be edited using this program, the only difference when you "develop" the CR2 RAW file is the addition control of "de-mosaic" and noise reduction.
De-mosaic is required to decode the pattern of the Red, Green and Blue filter distribution pattern used on the sensor.

Traditionally in a "Bayer" filter system there are twice as many green filters to make the response of the sensor more "in tune" with the luminance (brightness) characteristic of our eyes.

Once the image data has been "re-constructed" it can be reduced in noise, you controlling the amount of blur applied to mask either noise in the color (chrominance) or brightness (luminance) channels.

This is where you make the most significant improvement over in camera JPEG processed files.

A camera RAW file showing the sharpness adjustment control

There are a lot of adjustments which you can apply to "develop" the camera RAW data however, if you just open the file and leave the default "auto" parameters you will find that you may not need to adjust anything as the results are pretty good.

If you want to try and improve image detail with noise reduction and sharpening then you have this option, something you didn't get when the camera processed the JPEG file.

Unfortunately Silkpix® isn't very well received by users. It isn't as easy to use as Lightroom. I guess you could say that it is more of a scientific tool – a software laboratory tool!

In my personal experience, using this program also to process my JPEG images for noise reduction and sharpening is a real bonus; after all I didn't have to spend an additional amount of money in order to process the RAW files. I can do other post processing in my existing Photoshop Elements package which doesn't support this CR2 file.

Comparison of RAW versus JPEG Images

The case for, or against, the use of RAW files is probably best illustrated by use of two example images. The one being a in camera JPEG file in standard photo style and the other a Silkypix® processed image. Images were shot at ISO 800. (100% crop next page)

JPEG

Processed RAW

100% crops of the same images

Jpeg file
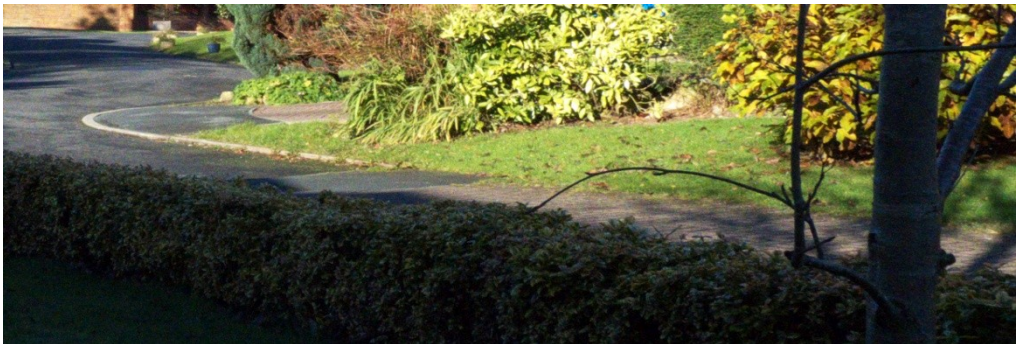
Processed RAW

As I think you can see from the 100% crop images above there is a little more shadow detail and a very slight increase in sharpness.

Had the JPEG image been processed for sharpness the result would have been comparable to the RAW file, if not better in this case!

The camera does perform an exceedingly good job of rendering the out of camera JPEG's given the changes suggested to the Standard Photo Style of +1 sharpening and -2 noise reduction.

For most of your images the RAW file will offer only slight advantages, and given that the subsequent processed jpeg can be adjusted for sharpness and noise reduction it would be my recommended workflow for this camera.

Exposure Bracketing (Auto Bracketing)

The use of exposure bracketing allows us to make a series of exposures with a pre-set level of over and under exposure. It is useful in situations where we haven't the time to keep dialling in, or out, exposure compensation. It gives us a little insurance against metering errors. In

some instances we can use the 3 images produced to create a single exposure with increased dynamic range, often referred to as a HDR image. The amount of over and under exposure is set in the Auto bracket menu.
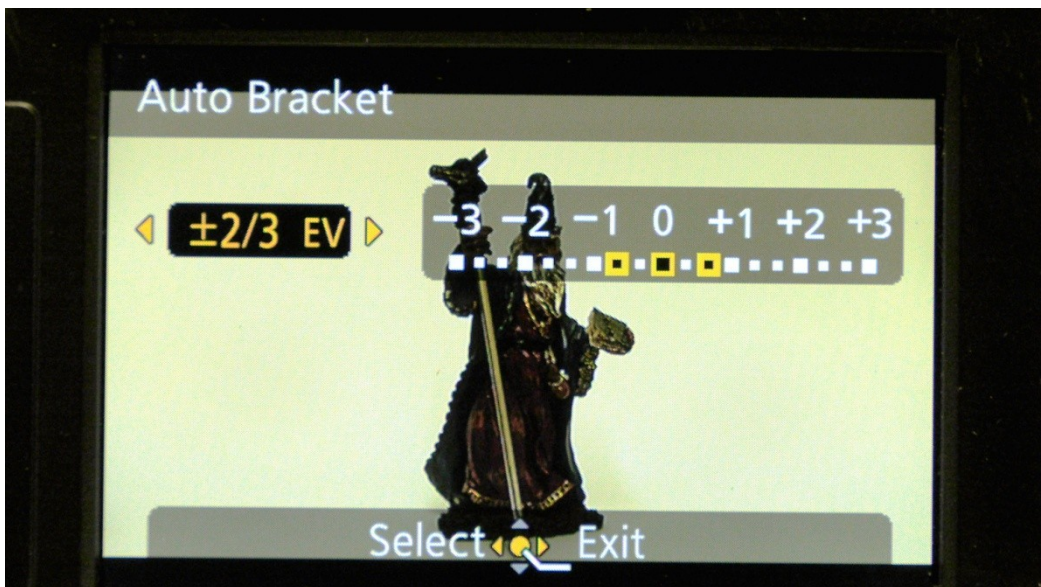
Once the auto bracket screen is displayed, by using the back control dial,or the navigation buttons ◄►, the amount can be pre-set (up to +/- 3 EV or F-stops).

Use Select to save and exit from the setting option.
Now when you press the shutter the camera will automatically make 3 exposures in the sequence of 0EV –EV +EV.

You can evaluate the images and keep the best exposure, if you are not combing them into a HDR image.

Here is an example of the auto bracket exposure sequence.

If you want to combine the three exposures to make one HDR image the subject must have no movement otherwise this would appear in the final composite image, ideally the camera should be mounted on a tripod or other solid platform.

Here is a HDR from auto bracketed exposures:

Normal exposure   -1/3EV   +1/3EV

The 3 images combined using the Photo Merge option in Photoshop™ Elements

Using the 3 exposures with small exposure latitude allows you to create a composite image with more highlight and shadows (dynamic range).

Using wider auto bracketing values allows a lot more picture information from each image to be composited, however going extreme can produce surrealistic looking images.

In-built flash head

Taking flash pictures with the in-built flash unit of the Panasonic Lumix FZ200 is essentially an automatic operation.
There is an option to adjust the output flash power in the semi-automatic and full manual mode but not in the iA or iA+ modes.

Flash is only activated when you slide the release lever to the front of the camera which allows the "cobra" style flash head to rise.

As the flash head is released the flash charging circuit is energised and in the EVF, or on the image on the LCD, will be a Red Flashing lightning symbol ⚡ indicating that the unit is charging. The camera will not release the shutter during this time. In the iA mode the flash will be set according to the scene detection mode the camera identifies.

If it detects a face it will change to Auto Red-Eye reduction mode which has an associated pre-flash in an attempt to close the pupils of the subjects eyes to prevent the main flash burst picking up the red reflection from the blood vessels at the back of the eye.

Otherwise it will output enough flash power to illuminate the scene correctly if the subject is within the camera's flash range of 30cm to 13.5metres (with auto ISO set).

When in any other camera mode (PASM) it is possible to control some of the parameters used for flash photography.

A Auto, flash will fire if the subject brightness dictates it.

A👁 Auto red eye reduction, fires pre-flash to reduce red eyes.

Forces flash on, flash will fire irrespective of subject brightness.

S👁 Slow sync speed red eye reduction. This allows darker backgrounds to have a brighter exposure by extending the shutter speed prior to the flash firing. It employs red eye reduction as well.
Forced Flash Off. Flash will not fire – it is not a menu option, you simply close the flash head.

A cautionary word about using the in-built flash of the FZ200. The lens hood will cause a dark shadow to appear on the lower part of your image if you are shooting at a wide angle setting. You should remove the lens hood when using flash to prevent this from happening.

Flash power can be increased or decreased by 2EV to compensate for any under or over exposure. This adjustment is found in the set up menu on page 5 of the REC Setup menu under Flash Power.

The flash is synchronised from 1/60 to 1/4000 second.

By using the hot shoe of the camera external flash units can be used when greater control of the lighting effects is required.

 As with all on-camera flashes they produce a very distinct shadow behind the subject and very unflattering lighting, diffuser material such as paper tissue can be used to softening effect for the flash.
Wrap around the flash head and secure with an elastic band or adhesive tape.

If you can shape the diffuser into a curve, thus allowing a little separation between the flash and the diffuser the results are even better as the point light source is spread out via the diffuser material.

Pop up flash light modifier

The "pop up" flash modification of a small piece of kitchen tissue held in place with a small piece of adhesive tape.

Direct "on-camera" pop up flash result

Using the tissue light modifier

Flash can have a variety of uses from providing the only source of illumination for a scene or providing "fill in" light to counteract strong backlighting.

It can also be used to cancel the effect of ambient light which has an undesirable color balance such as with fluorescent light, which tends to be slightly green in color.

In this situation you will need to turn "forced flash" on, and you may have to adjust the output flash power or change the distance of the camera to the subject to get the ratio of ambient to flash light correct.

Using Flash Adjust to change power   *-2 to +2 EV or f-stops of light control*

There is an adjustment in the REC Setup mode for Red-Eye removal, this is a software based process which will attempt to "fix" any red eyes which were not reduced by the pre-flash red eye correction method. You will notice that if you have it set to "on" the icons change in the flash setting menu to show a small paint brush alongside the eye symbol. It works with face detection to prevent unwanted image areas being converted to black inadvertently.

Digital (software based) red eye reduction and the paint brush symbol denoting that you have it enabled.

In the flash setup mode is the option to set a front or rear curtain shutter.

Front Curtain Sync - is the normal flash mode, with the flash being fired near the start of the shutter opening. The flash finishes quick, and freezes the motion, and then the slow shutter remains open longer, and can blur due to the continuous ambient light, So the ambient blur appears later (out in front of where the flash fired), appearing to lead the motion. Not a natural look (when there is blurring from the ambient).

Rear Curtain Sync - waits to fire the flash until almost the end of the shutter duration, so that the ambient shutter blur occurs first, which then appears to follow the subject (appears back where it previously used to be, before the flash), which looks more natural to the motion.
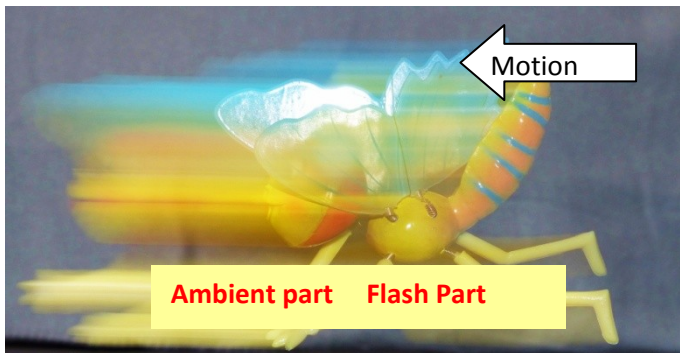
Front Sync curtain

Rear Sync curtain

Manual and Pre-Set White Balance

Automatic white balance, in most cases, generally does an excellent job of setting a neutral color balance in the camera produced JPEG image. It does this by looking for any pixels which are considered as highlights, or have values close to mid grey tone.
The camera processor then corrects any offsets in one color, or more, to produce a white of equal red, green and blue value.

Where it may fail is if there are no predominant highlights to be assessed or if there is a predominance of a primary or secondary color.

In this situation a more pleasing image will be obtained using either a camera pre-set white balance or performing a manual white balance set operation and fine-tuning it, if needed.

Using a pre-set control has advantages if you want to keep consistency of color in a series of images shot at the same time where auto white balance might create small shifts in color.

The Auto white balance, is the camera default. It can be changed using the WB button.

The Daylight white balance pre-set gives a color temperature similar to that found in a sunny day at around 5600° Kelvin.

Cloudy and Shade pre-sets have a progressively "warmer" tone and can be used to provide a subtle hint to an otherwise cold looking scene.

The Flash preset again adds a more yellow hint to counteract any "blueness" that may occur using flash as an illuminating source.
The Incandescent preset corrects the strong re-yellow cast that is often predominant in scenes illuminated solely by tungsten lamps.
As there is a marked difference between tungsten halogen and plain tungsten filament lamps the color correction may not be ideal.

Setting Manual White Balance

Manual white balance set procedure allows the camera to set the correct white operating point given a white (or neutral grey) target as the reference.

The Manual white balance pre-sets; White Set 1 and White Set 2 give two independent controls with which to register two lighting conditions.
Cursor to the right (►) to present the target area.

Ensure the target area is completely covered by the white, or neutral grey card, and then press the "SET" button.
The camera will make an exposure and set the white point for you.
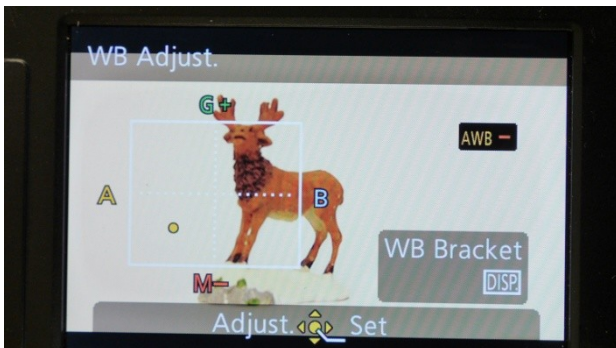
If you require to "fine tune" the operating point set by the camera you can use the WB Adjust screen accessed by using the right navigation key ►from the White Set Screen.

136

Fine tuning the operating point of the white balance point which was set by the camera allows you to match subject and image colors more closely.
The image control has two axes; Blue-Amber and Magenta-Green.

Moving the yellow dot with the navigation keys allows you to add a color bias to the image in any of the axis directions, or by positioning the dot within a quadrant between the two axes allows both colors to be added. In the example below the image has been given a "warming" bias by shifting the yellow dot between the magenta and amber axis. These two colors produce a red hue.
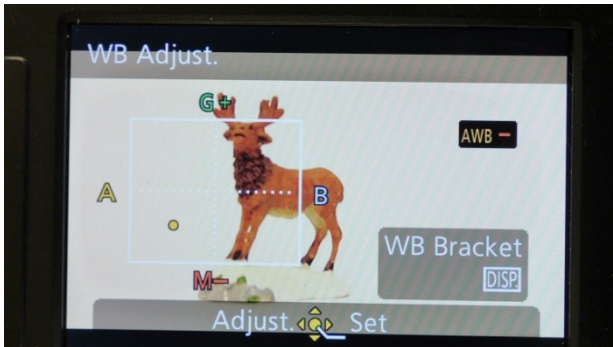
The control point positioned between the magenta and the amber axis using both the down and left navigation buttons ◄▼

Auto white balance

Manual white balance

In the above example the reds of the deer appear muted in the AWB mode, (slightly cyan) after doing a manual white balance set using the white background the warmth of the colors returned.

If you are in bright sunlight, sometimes the camera will find the intensity

of the target too high and will not allow a set point to be created. In this situation you will need to use 18% reflective neutral grey card. These are available from many on-line photo accessory retailers.

A set of three white balance point calibration cards. Small and convenient to carry in your camera bag.

The final way to set the white balance is by manually adjusting the color temperature.
The color temperature scale is in ° Kelvin and the camera has a range of 2500°K to 10000°K.
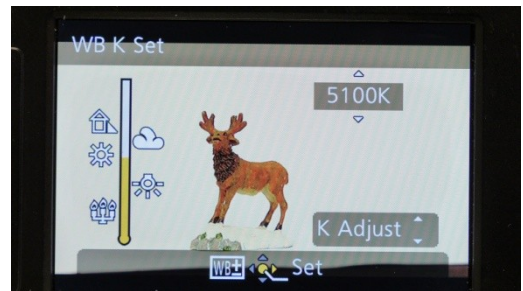
When you adjust the scale using the up/down navigation buttons ▼▲ you can see the actual °K indicated. If you select a temperature that is below the current white point as "seen" by the camera, the resulting image will be "colder".

Conversely if you wanted to add more warmth to a sunset dial a °K much higher such as 10000°K.

Face detection and recognition

These are the two distinct operations needed by the camera to allow faces to be seen and used for setting primarily focus but also exposure.

Face recognition will attempt to identify faces in an image and set the principal focus based upon a priority list assigned by you at the point of registering a face with the camera database. Face Detection can detect up to 15 faces in an image by eyes/nose/mouth profile.
Begin registering a face by selecting Memory from the option list in Face Recognition in the REC set up mode page 2

Select Memory from option list.
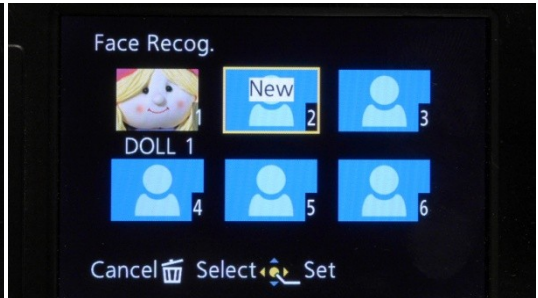
Cursor to a NEW Face position, press SET.
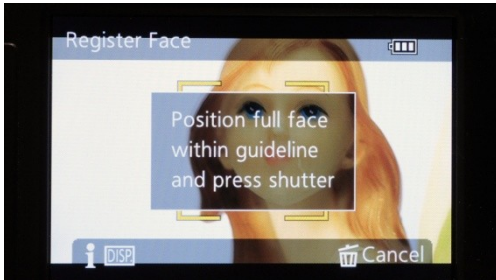
Position the subject face with the guide and then press the shutter button.
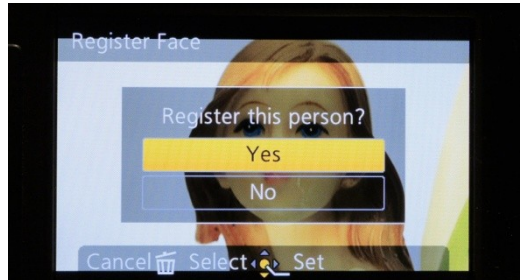
If the camera determines that the face can be recognised select Yes to add to file.

Add your subject's name.

Enter the name and press select Set.
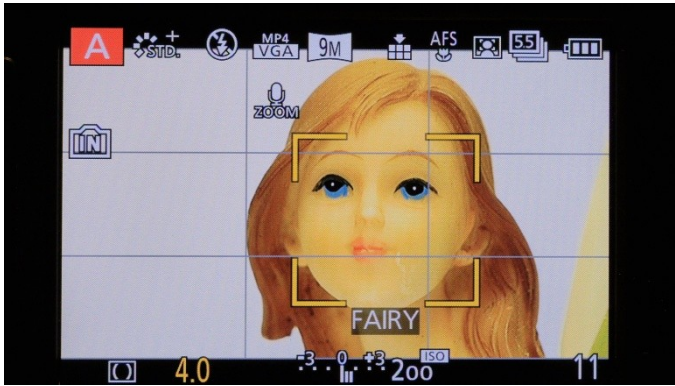
Repeat this for any new face you want to add to the camera database. You can store 6 faces.
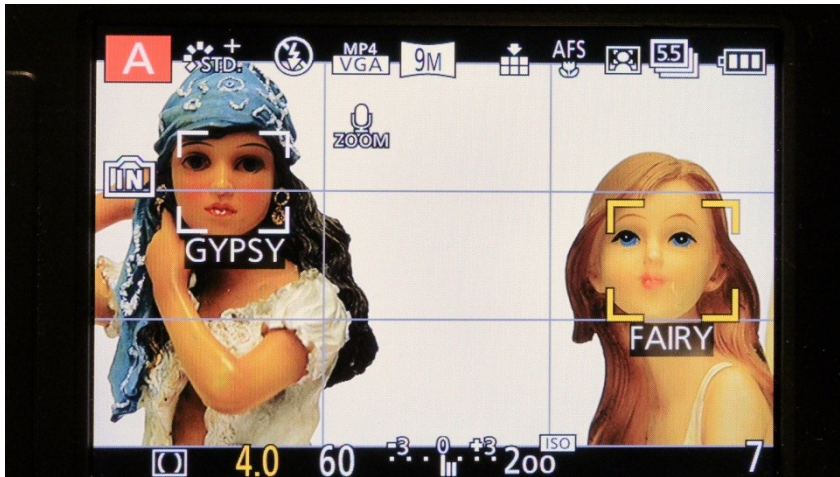
With Face recognition ON whenever the camera recognises a face it will display the name of the subject, will track the subject if it moves

The camera is capable of detecting 15 faces in a scene by looking for a eyes/nose/mouth configuration. If the detected faces match any of those stored in the database it will identify them on the screen as illustrated above. Focus priority can be assigned in the priority setting of the menu.
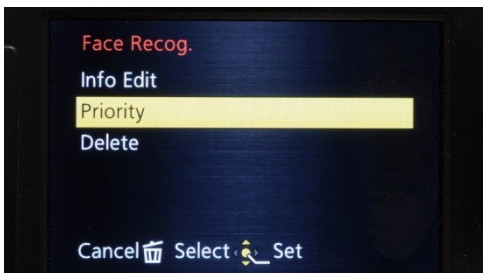
Setting focus Priority
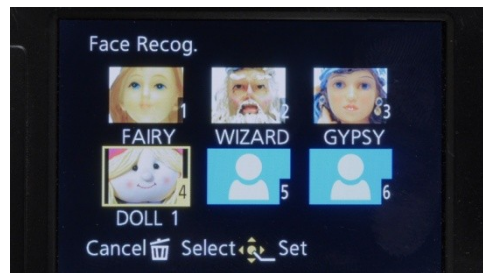
Use cursor to change the focus priority

Recording Video

The Panasonic Lumix FZ200 delivers outstanding video quality.
If you shoot in the highest quality mode of AVCHD with 28Mbps data
rate at 1080p the image quality is really comparable to "pro-sumer"
camcorders costing much more.

With version 10 of iMovie and version 10 of Final Cut Pro for the Apple
Mac the native editing of Panasonic AVCHD files is now supported
without the need for intermediate conversion to an Apple friendly file
such as Quicktime. This means that FZ200 users can now edit 1080p
AVCHD files.

There is still the option is to use the MP4 format, which has a slightly
lower bit rate of 20Mbps and this is more suited to less powerful
computers.

Panasonic refer to their recording qualities by the names of:

Quality	Size, Bit Rate and Frame Rate
PSH	1080 AVCHD progressive 28Mbps 50/60 fps
FSH	1080 AVCHD interlaced 17Mbps 50/60 fps
SH	720 AVCHD progressive 17Mbps 25/30 fps
FHD	1080 MP4 20Mbps 25/30 fps
HD	720 MP4 10Mbps 25/30 fps
VGA	640x480 4Mbps 25/30 fps

These all relate to the "normal" video modes and not the 100/120 or
200/240 fps high speed manual movie modes.

Video "Rec Mode" and "Rec Quality" are both adjusted in the "Motion
Picture" tab of the "Rec Setup" menu page.

Motion Picture Record Mode

AVCHD OPTIONS	MP4 OPTIONS

Whichever mode you set the camera to record in this mode is common to both recording video in the fully automatic iA and iA+ modes and all the semi-automatic and fully manual modes.

To start recording a video clip in any mode, apart from the creative video mode (the movie camera icon), it is a simple matter of just pressing the red record button on the top plate of the camera.

 The video record button is used to start and stop video recording in all modes except in "Creative Video Mode" where the shutter button is used to start and stop recording.
If you program the size lever to Focus mode and switch to manual focus you can perform some rudimentary "focus pulls" using the side lever.

During recording the screen of the LCD display will indicate the remaining time left for the clip being taken, the video mode and quality and the exposure compensation value. Recording time will be limited to 29 minutes and 59 seconds for European sold cameras (to comply with EU tax laws on camcorders) and to file sizes of 4GB for all other regions (FAT32 file segment size limitation).
This equates to around 80 minutes in PSH mode or 90 minutes in FSH mode. In MP4 video mode it is around 100 minutes of FHD recording quality

If you are shooting the video in the iA or iA+ mode, as with the stills photography mode, the camera will attempt to classify the scene type and set appropriate recording parameters to enable the best video quality to be recorded. The screen will display the current scene type

being used by the camera in recording the current clip.
In the iA and [iA+] modes any parameters which have been set, for example, background defocus, [brightness adjustment or color tint] will be recorded in the video clip.

In semi-automatic modes; P, A or S the White Balance only is used, all other parameters are ignored. The camera will not identify very low light levels in these modes and not switch to the iA "candlelight mode".

In SCN (scene modes "Night Scenery" and "Night Portrait" modes will allow the higher sensitivity candlelight mode to be identified and operate. Other Scene modes such as "sunset" use that condition whilst others such as baby1, baby2 and pet use the default recording conditions.

If you select the "creative" stills modes most of those will transfer to recording in video mode. Sepia, Expressive, Retro and Monochrome work exactly as they would in the stills mode.

The Miniature mode records in exactly the same way as setting up for the stills mode with Fn3 button allowing you to set the position and width of the sharp area of the video clip. Zoom may be used.
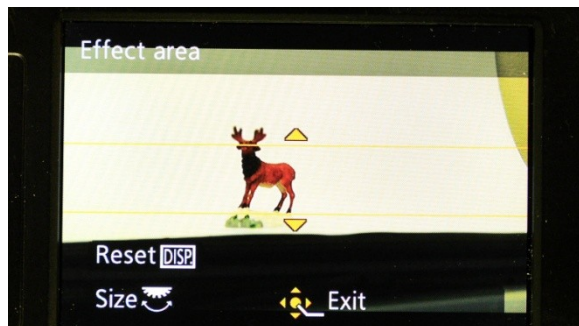
The Fn3 button brings up the adjustment screen so that you can adjust the size of the central zone of sharpness.

The clip is recorded at about 4 times speed so a 30 second clip will take 2 minutes of recording time. There is no audio recorded with this mode.

Creative Video Mode recording
In creative video recording we have a lot more control over the way in which the camera records the clips. Manual video mode is engaged by turning the top control dial to the icon of the movie camera so that it aligns with the index mark on the top plate of the camera.

The Creative Video Mode Selected with the mode control dial.
Recording is started and stopped using the Shutter release button
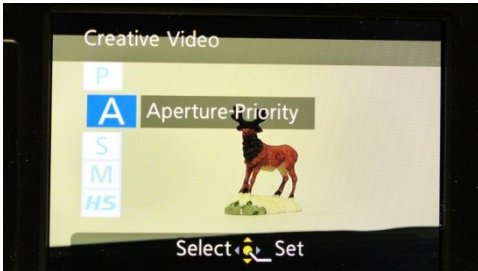
Options are:
Program auto
Aperture priority
Shutter priority
Manual exposure
High speed video

These options are all selected from the creative video mode menu.

These modes use the metering mode currently selected to establish the correct exposure. As the aperture cannot go below f2.8 and the shutter speed cannot drop below 1/30 sec if the display looks dark you will have to increase the ISO to brighten it!

In Aperture priority mode the aperture range is f2.8 to F11 (f8 is the stills limit). Again if the exposure cannot be achieved with 1/30th second ISO has to be increased.

In Shutter priority mode the range is 1/30th to 1/20,000th second. Obviously at this very short shutter speed a very intense light source is required to capture a correct exposure level. This mode may be useful for analysing high speed motion, with audio.

In the Manual mode the shutter range is extended down to 1/8th sec (if you also use manual focus). This allows you to get some really low level light clips, providing there is no subject motion as this would appear as ghostly movements. To get the most "cinematic" look to your video clips it is recommended to follow the 180° rule. This is the same shutter angle as used with film based motion picture cameras. To achieve this same

shutter angle the shutter speed should be set to twice the frame rate. In the example of 25fps the shutter speed should be 1/50th second. Maintain the exposure in M mode with aperture and ISO adjustment.

The exposure meter gives a good indication of exposure, balance the exposure by correcting under or over exposure indication on the meter scale by using the aperture, shutter, ISO or all three parameters.

Whilst recording a video clip a still image may be acquired by pressing the shutter release button if you are recording in any of the semi-automatic modes. The image will be limited to 16:9 aspect ratio with a 3.5M pixel count which is more than adequate for inclusion in a HD video or display on a HDTV screen.
You cannot capture a still image in creative video mode as the Shutter release is used to start and stop the recording.

During video recording, audio is captured via the stereo microphones on the top of the camera.
If better audio quality is required, or if you wish to record the audio without the zoom motor being heard during any zoom operation, you need to use an external microphone plugged into the 2.5mm microphone port on the top of the camera.

Panasonic produced a dedicated microphone the MS-1 for this camera. It is a battery powered electret condenser microphone. However any microphone of a similar style, such as the Rode® Videomic will work if you use a 3.5mm to 2.5mm adaptor.
For more details on video recording codecs see my Youtube tutorial here;

https://www.youtube.com/watch?v=nDekc-yeWHQ

and for more details on creating videos

https://www.youtube.com/watch?v=k4mXsKWyOuI

and for more information regarding recording audio

https://www.youtube.com/watch?v=LCWLlfT4q0o

Programming the camera function buttons

By assigning commonly used menu functions to the programmable function buttons Fn1 – Fn3 you can quickly recall menu items or set camera conditions very quickly.

Fn1 and FN3 can de directly assigned whilst Fn2 is a shared option of either AF/AE lock or the Fn2 button.

To begin assignment you need to select the Fn Button set menu on page 2 of the "tools" menu.

From Fn Button Set option.

Select the required button.

The button function can be from any

Of the options listed over 3 pages.
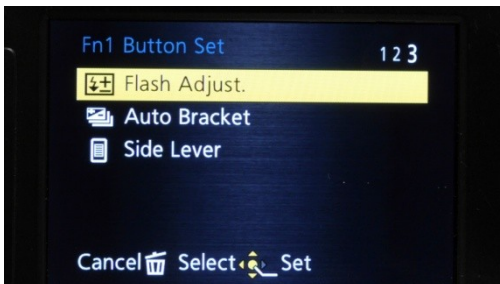
The choice made will be deleted from the list available t the other buttons.

If Fn2 is set to AE/AF lock it cannot be used for any other purpose unless set as Fn2.

Custom Setups

One of the most useful additions to the camera setup options is the ability to create, and use, "custom setups".

The custom setups allows you to define and recall specific setups you might want to make for your style of photography.
There are 4 setups you can make:
C1- this is directly accessible just by turning the mode control dial to the C1 position.
C2-1, C2-2 and C2-3 are accessed by turning the mode control dial to the C2 position and then selecting the C1, C2 or C3 setup.

To use your presets, you first make all the changes you want in the menus, and then these can be saved as the settings for your selected mode.

The C1 and C2 preset custom modes give you the rapid ability to select a set of known setup conditions so you can quickly shoot a scene without having to scroll though all the menu items to make sure everything is set the way you want it.

Setup all the parameters you want to store and then select Cust Set Mem, then navigate right ►to select which preset setting to use. To use the settings just select C1 or C2 from the mode control dial.

Most of the main settings for the camera can be stored in the Custom profiles. Photostyle, aspect ratio, image quality, metering mode, focus mode, focus style, ISO, exposure value compensation, i.Dynamic, i.Resolution, digital zoom and auto bracket exposure.
Values for Aperture and Shutter speed cannot be pre-set as they are used in other setups. If you want a specific variation for a photostyle save this first as the "custom" photo style and then set this as the photostyle in your defined Cust Set Mem profile.

How to photograph anything

In my opening preface about this guidebook I stated "I've purposely avoided giving detailed information on how to take specific types of images such as "travel pictures", "sports pictures".

Instead I have tried to concentrate on giving you the tips and techniques for using the features of the Panasonic Lumix FZ200 to take *any kind of image* you want".

Well that statement is true. To photography "anything" just requires you to analyse the subject and ask yourself the following questions:

Is the principal, or most important, factor one in which I will require the most, or the least, depth of field? If so then this will determine that the Aperture priority mode will be required to allow you to set an aperture that will give you this amount of depth of field at the lens focal length you have chosen.

Or is it that you require to capture some kind of image motion, being that deliberate blurring or capturing absolute freezing of the action? Then this will require you to select a Shutter priority mode to enable you to set the required shutter speed to capture this effect.

Or is a combination of depth of field and a requirement to capture some sense of motion either blurred or frozen action shot?

Then this will dictate that you will have to use the manual exposure mode so that you can set aperture and shutter to the required values and then use the ISO control to provide the correct exposure.

Let's look at the principal elements of the exposure again.

DOF or depth of field is determined by three components;
The focal length of the lens
The aperture of the lens
The distance of the subject to the lens

In the case of the focal length of the lens, if the focal length is small, e.g. wide angle or 25mm (equivalent) then inherently the DOF is quite large at all subject to lens distances.

If we were to take a picture of a subject that is very close to the lens, then we would see that the subject and a large amount of the background would also appear to be in sharp focus. This is true even if the aperture was wide open, or a value of f2.8 in the case of the FZ200.

Large depth of field at wide angle setting

If we move the subject extremely close to the camera then we can get a similar DOF effect that we get if we were to use a longer telephoto setting, as in the example below where the subject is just centimetres away from the lens.

Shallow DOF with wide angle lens, achieved by the subject being extremely close to the lens.

By understanding how lens focal length and subject to lens distance affects the DOF you can determine what method to use. In some situations it may not be possible to get the camera so close to the subject. Photographing insects may be an example of this. To achieve the result of a shallow depth of field, that is one with a very blurred background, at a reasonable distance from the subject we will need to resort to using telephoto settings, i.e. 600mm(equivalent).

Shallow DOF achieved by using the telephoto setting of the lens at 1 metre from the subject

The aperture plays a lesser role in determining the background blur. However by using a small aperture, like f6.3, it helps to increase to zone of focus (DOF) to include the insect or plant being photographed.

When considering subject motion, we need to determine if we want longer shutter speeds to allow a degree of subject blurring to occur due to the subject movement or faster shutter speeds to freeze the action.

As a general rule the shutter speed to arrest subject movement will depend upon the focal length of the lens due to the amount of image magnification. If you are using telephoto settings to capture the image then the rule of 1/focal length of lens is probably a good starting point for achieving blur free subjects. This should not be confused with camera shake reduction which the optical image stabilisation of the camera (OIS) is designed to control.

The OIS only compensates for camera movement; any subject movement is still recorded in the image.

So even though OIS allows us to shoot with at least 3 f-stops of equivalent shutter speed advantage it does not arrest subject motion.

In the illustration below of the "Big One" at Blackpool Pleasure Beach the carriage hurtles down the highest drop of the ride. I used $1/640^{th}$ sec to capture the image without any blur.

Use of faster shutter speed to arrest subject motion at telephoto lens settings

If you use a telephoto convertor lens, to achieve greater image magnification, this is even more important.

Use of an additional teleconvertor lens makes it even more important to select fast shutter speeds to eliminate any subject motion blurring in the image.

To capture motion blur we need to use longer shutter speeds. In the example of capturing waterfalls with silk like appearance we used shutter speeds in the order of ½ to 2 seconds long. To achieve these longer times, especially in brighter ambient lighting we need to use neutral density filters to reduce the amount of light entering the lens.

Common values of ND4 give 2 f-stops reduction and the ND8 will give 3 f-stops reduction in light. You may also need to use the lowest ISO as well (100) and a small aperture (f 7.1) to achieve these longer shutter speeds required to capture these types of shot. Obviously such long shutter speeds will need the camera to be very stable for this exposure. Use of tripod, bean bag or other mechanical means, to hold the camera rigid is essential. Use the self timer or remote shutter cable to make the exposure to prevent any camera movement.
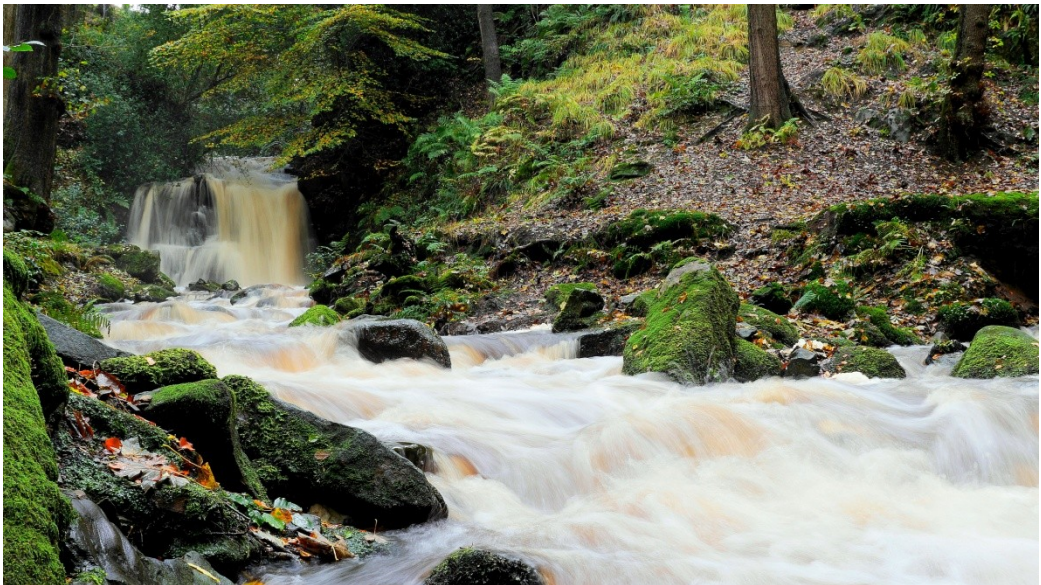
Use of longer shutter speed to capture subject motion blur.

So the essence here is to analyse which component you need to concentrate on to produce the effect you want to see in your image.

There are some other situations which will also direct you into which mode to put the camera in to capture good images.

So called "low light" photography is one of those areas.

Low Light Photography

Shooting in low light levels presents a significant challenge to any photographer, not only users of the Panasonic Lumix FZ200.

How do we quantify low level light? Take a look at the selection of images below. Each one could be considered low light as there is no universal definition for this category of photography!

In many of the images shown above there are some similarities. The overall exposure times are less than $1/30^{th}$ second. Could this be our definition of "low light" photography?

Each of the images shown required a different technique to capture an image of good quality. The toadstool on the forest floor and the candle light photo needed a bean bag, or tripod, to hold the camera steady. The stage photograph needed a pause in subject motion to allow a $1/5^{th}$ second exposure. The church interior needed the camera rested on a church fitting to capture the ½ second exposure.

Some of the "low level" light scenes can be deceptive however.
Take the image of the moon it is actually quite bright. It reflects light from the sun and can actually be classed with the daylight $1/16^{th}$ rule.
This rule suggests that in bright sunlight if we use an ISO of 100, a shutter speed of $1/125^{th}$ sec and an aperture of f16 we will get a perfect exposure.

As our moon is a giant reflector, given our camera will only allow us to set f8 we can easily get an exposure of $1/500^{th}$ sec at f8 and an ISO of 100.

We have seen previously higher ISO values can lead to image noise, particularly in shadow areas. To get the best quality images it is important to avoid using the higher ISO's and find a way to use the lower ones – either by larger apertures or slower shutter speeds. The method of achieving either will, of course, depend upon the subject.

Close-Up & Macro Photography

We have seen that using a wide angle setting with the lens and moving close to the subject will allow you to take some extreme close-ups such as the one shown below.

Close-up using 25mm setting and a few centimetres from the subject

Whilst this does give great results it can lead to "perspective distortion". If this is the case, or the fact that some subjects may not allow you to get so close to them, then we need to look at other methods of achieving a larger image on the camera sensor.

One of these methods is to use "close-up lenses" or "filters" as sometimes they are erroneously referred to as. These supplemental lenses act like correction lenses that we find in spectacles. They modify the focal length of the lens in front of which they are placed. They are positive dioptres which effectively allow the lens to focus closer.

A set of 3 close-up lenses, the #1, #2 and #4 and an optically corrected "achromatic" close up lens. All have a 52mm filter thread and screw directly onto the front of the FZ200 lens.

The basic lenses are of just one element construction, some are multi-coated to reduce reflection however the majority are just optical glass. This is fine if you just want to experiment with close-up photography and provided you understand some of the limitations they will give you excellent results like the image below taken with such a set.

Close-up using the #2 close-up lens and the camera at 108mm equivalent focal length

These lenses do suffer from color fringes (chromatic aberration) and from edge definition fall off because of the lens curvature of field. This is especially so with the higher value ones (#4 and #10). If you look at an enlargement of the above image you will see both effects!
Using a small aperture like f7.1 will help to reduce the edge distortion.
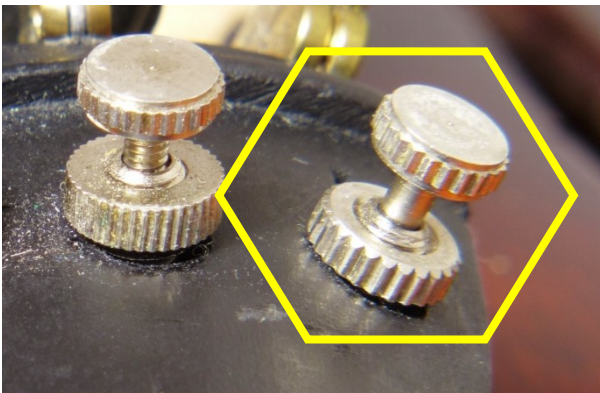
Evidence of chromatic aberration and edge definition fall off with the #2 lens.

To overcome the limitations of the single element lenses special lenses called "achromatic" lenses are available. The most popular are the ones available from "Raynox™" and simply clip onto the front of the lens.

The "Raynox™" M250 close up lens is very popular for use in close up photography

What about the change in focus, or more importantly the working, distances achieved with the addition of these close up lenses? Well, by definition of the dioptre, with the camera's lens focused on infinity and a #1 dioptre close-up lens fitted, the maximum focusing distance becomes 1 metre, with the #2 it becomes 0.5 metres, and with the #4 it becomes 0.25 metres.

You may see a lot of information regarding "magnification ratios" and "macro", what do they mean?

Take the "magnification ratio" example. If the image is one-quarter the size of the subject, the magnification is 0.25x. If the image is one-half the size of the subject, the magnification is 0.5x. When the image and the subject are the same size, the magnification is 1x.

The term "macro" photography generally means that the image size is actually larger than life size. However the term now is used to define a lens which will focus more closely!

When using a supplementary close-up lens, it is very easy to calculate the magnification for a camera lens set to infinity focusing.

Simply divide the focal length of the camera lens by the focal length of the close-up lens.

Conveniently, the focal length of the close-up lens is derived by dividing 1000 by the dioptre #.

So, for example, the #2 dioptre lens has a focal length of 1000/2 or 500mm, the #4 lens is 1000/4 = 250mm.
So, for example, if we now set the camera to the equivalent of 100mm by

using the zoom lever to achieve x4 optical zoom and we fit a #2 lens in front of the FZ200 lens, the magnification would be 100/500, which is 0.2x. This means that a 10cm wide image would be 2mm long on our 8mm wide sensor.

The same close-up lens with the FZ200 set to 200mm (or x8 optical zoom) will give a magnification of 200/500 which is 0.4x.
Zoom all the way out to 600mm (x24 optical zoom) and the magnification becomes 600/500 which is 1.2, slightly bigger than life size!

As you can see, the magnification increases with the focal length of the camera lens. Even greater magnifications are possible if the camera lens is focused closer than when used at its infinity setting.

The Type #4 close-up lenses give double the magnification of the #2 and the #2 gives double that of the #1 close-up lenses.

The following illustration summarises these points;

#1 lens

8cms wide

57cms – 108cms
22in – 42in

#2 lens

6cms wide

40cms – 53cms
16in -21in

#4 lens

3cms wide

26cms – 30cms
10in – 12in

Closest subject to lens front distance
Farthest subject to lens front distance
Subject width at infinity focus
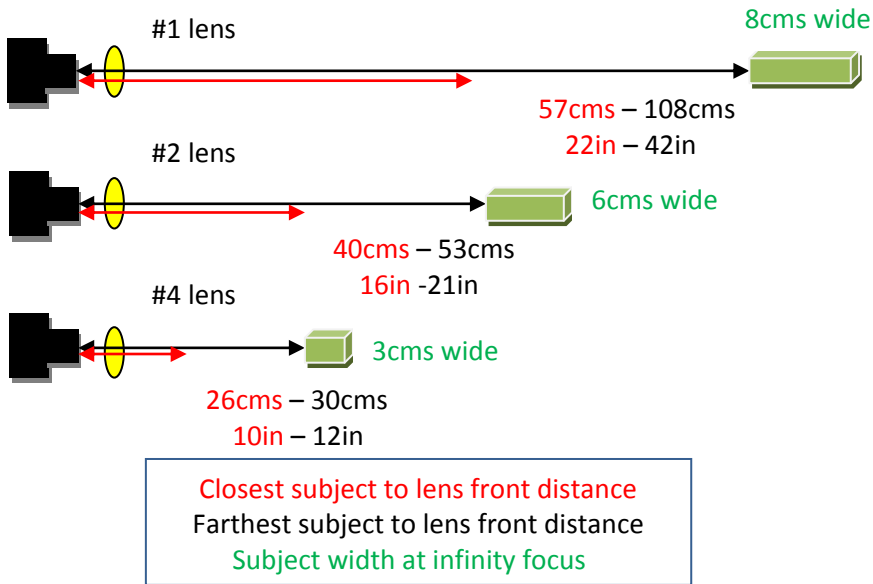
The more powerful the close-up lens and the longer the focal length of the FZ200 lens, the larger the magnification ratio of the FZ200 will be.

Two examples of small models photographed using the #1 close up lens and then a superimposed background added.

Die cast Model and Church interior added.

Plastic Model with a digitally rendered background.

Accessories

There are several "accessories" which you can purchase to allow you to make better images. They may be to add additional lighting to a scene such as with an external flash gun, or add stability to the camera whilst taking a picture with a long exposure time or maybe just a convenient way to carry the camera when out and about. Other photographers might want longer telephoto or wider wide angle shots.

The way we "accessorise" our camera will obviously depend upon our own personal needs as a photographer.

Filters:

Filters allow us to modify the light entering the camera lens in order to create some lighting effect. It may be that we want to reduce the light to allow us to use longer shutter speeds, or to reduce reflections from water and foliage.

Maybe we want to improve the sky to ground exposure differences in landscape photography. Filters are the answer to these photographic situations.

Filters, however, come with a risk of reducing image quality - depending upon the type of filter. This might be from poor optical transmission or ghosting and flaring due to reflections from the FZ200 lens.

Many of us were "persuaded" to buy a "UV" filter when we first purchased the camera – the salesperson was probably commission based and a fairly expensive filter may have helped him/her sell this to you! With digital cameras there is absolutely no need to add UV filtration to the camera.

Digital sensors are not as sensitive to UV as previous emulsion based film was. Adding the filter can degrade your images.

Only if you are working in an area where dust or water splash is a real potential hard do you need to add physical protection to your lens!

After the potential hazard has gone, remove it again.

A selection of 52mm filters used to modify the light entering the FZ200 lens.
Neutral Density, Circular Polarising and Fluorescent light correction (FLD "Rose").

We have discussed neutral density filters previously when looking at extending the shutter times in order to capture silky flowing water or to set the shutter speed/shutter angle in videography.

The first filter that you might want to purchase is the CPL or circular polarising filter.

These work in exactly the same way as the polarising sunglasses we might wear to reduce glare and reflections in bright sunlight.

They work by "cutting" incident light which is reflected back from an object where the light is 90° to the camera axis. If the light doesn't reflect back from the subject with this angle the degree of reduction effect is reduced.

These CPL filters are almost always round in shape and have a rotating glass element. The rotation of the filter is necessary for you to view the degree to which the light is being reduced.

Turning the filter slowly whilst observing the image is necessary to find the point at which the "cut" begins.

The angle of "cut" is normally quite small, perhaps only 20° or angular rotation.

Circular and linear polarising filters achieve the same effect however because the camera autofocus relies on polarised light to work properly.

Using a linear polarising filter may interfere with the correct operation of it.

Hence Circular polarising filters, which modify the light, are used.

Circular polarising filters are most useful for darkening skies as well.

Without a polarising filter.   *With a polarising filter attached.*

The filter can be screwed directly onto the camera lens. Watch out for the thickness of some of these filters. Some of the thicker ones have more metal around the filter glass and may cause vignetting to occur at wide angle settings.

The second most useful filter, especially if you photograph a lot of landscapes is the "graduated neutral density" filter. This filter is normally supplied on a 100mm square clear acrylic plastic sheet and consists of a half coated surface of a neutral dye.

The intersection between the neutral density part and the clear part of the filter is not a distinct line but "graduated" so that a hard line is not recorded on the camera image
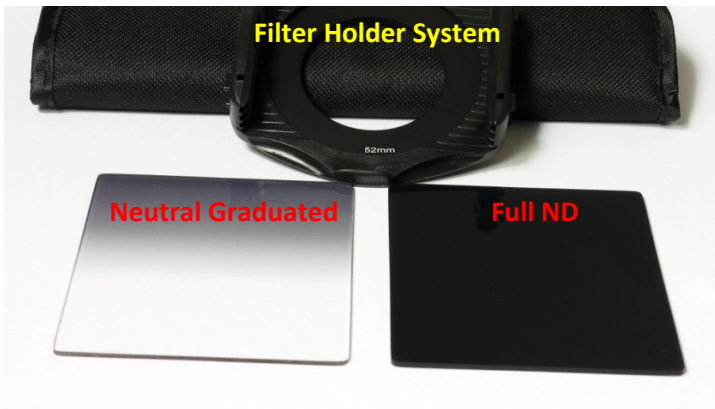
The 100mm square filter system.

Holder and the coated, or dyed, acrylic sheets.

The filter holder uses a 52mm adaptor ring to attach it to the lens. Most allow 2 or 3 filters to be "stacked" together to achieve multiple affects. They are not as robust as glass filter systems so care must be taken not to scratch the surface of the acrylic sheet. They do however provide a very cost effective way of enjoying the effects created by using these

filters.
Whole systems of filters have been developed to create a variety of effects.

Some of these can be reproduced in post processing however you have the visual confirmation that you have captured the effect you want at the scene before you leave.

The original Cokin™ range is sometimes how this system is known as.

The 100mm square filter holder system (Cokin)

Some photographers still use (as I do) the FLD filter which was used to correct for the green color cast which was prominent when you shot daylight film under this light.

Today we can perform a manual white balance and correct this.

However this "rose" colored filter can be used to emphasise sunsets or when shooting urban landscapes at dusk to correct for the green fluorescent lighting in buildings if we use daylight white balance setting in the camera.

If you shoot within 30 minutes of the sunset (at my latitude 53° north, sooner nearer the equator) you will retain the right blue colors in the sky, plus the sunset hues and the neutral office buildings.

Daylight white balance.

Daylight white balance with the FLD "rose" filter attached.

Tripods and other support systems

Tripods, monopods, "gorilla pods", bean bags and other mechanical measures to hold the camera steady during exposure are largely a personal preference.

Each of the systems has both advantages and disadvantages. Tripods are ideal as they do provide a solid support for the camera but their size and weight often means they are left behind when planning a photo trip

Since the Panasonic Lumix FZ200 isn't really a heavy camera, many of the lighter tripods are adequate to support the camera payload. Many of these fall into the "travel" category and fold up into a small footprint. This makes it more convenient to carry and makes it more likely that you will take it with you when you go out on a shoot, especially if you intend to shoot video clips.

The Manfrotto 393 Photo-Movie Kit

Offers good height and stability, quick release plate and pan and tilt head.

Many other tripods are stable enough for the light payload of the FZ200, again the amount of use/cost should be considered when purchasing your tripod.

If you intend to shoot a lot of close up macro shots of plants and insects it is worth investigating tripods where the column can be reversed to allow the camera to sit between the tripod legs and get really close to the ground. Some tripods allow the column to swing through 90° to allow this facility. There are options for "ball and socket" heads which allow rapid setting of the camera position or conventional "3-way levelling" head. Newer versions now have rapid pistol grip systems to position the head. Your own preference will dictate which tripod system is best for you.

Monopods offer some advantages especially if you are a sports shooter as they allow you hold the camera steady in a vertical plane and yet you are still able to pan with the camera to follow live action events.

The new "gorilla pods" with articulated jointed legs offer a versatile way to hold the camera in situations where either tripod or monopod would not achieve the desired result.

For example the "gorilla pod" can be used to support the camera on fences, tree branches and railings etc., as well as in the conventional tripod configuration.

There are two basic types, a light weight version and one aimed at DSLR users.

The light weight one is really only designed for compact digital cameras and you may experience difficulty in getting the head to stay exactly where you want it to.

The "gorillapod", or in this case the "spider tripod" from Vivitar® is a convenient way to hold your camera on a variety of surfaces. The jointed arms are able to wrap around round and rectangular sections such as tree branches and fence rails. They normally have a quick release plate at the head of the tripod.

Whichever system you use it is worth using either the inbuilt 2 or 10 second timer or a remote shutter release to commence the exposure to minimise any camera shake from degrading the image.

An example of 2 wired remote releases. The one on the left is just a basic focus/shoot device whilst the other is a fully featured "intervalometer" where the start/stop and interval times can be programmed. It is used in time lapse photography.

There are also available wireless remote releases which can be used to fire the shutter remotely or start and stop video recording in the manual mode. They have a range of up to 80 metres, outdoors.

A wireless remote shutter release- the Pixl R221

These devices all plug into the mic/remote port of the camera so the use of an external mic is not possible if you are using the remote to start and stop video recording. Watch out for many of these receivers are "standard" for use with other cameras. The connecting cables must be plugged in correctly. The three contact plug to the receiver and the 4 contact plug to the camera. Install the cable the wrong way round and it will not work!

External Flash

The use of external flash, either directly attached to the camera hot shoe, or remotely triggered adds additional lighting control for those wishing to use just simple, or studio, flash set ups.

Panasonic do a range of TTL (through the lens) compatible flash units
DMW-FL220E – a small unit with a guide number of 22
DMW-FL360E – a larger unit with a guide number of 36 and has a bounce and swivel head.
DMW-FL360LE - same spec as the FL360E but with the addition of a LED video light
DMW-FL500E – a full featured flash unit featuring a bounce and swivel head with a guide number of 50.

The Olympus FL36 (identical to
Panasonic FL360)

With the Olympus FL36, functionally equivalent to the Panasonic FL360, the head will auto-zoom when you have the head pointing forward.

This means that the flash will select one out of six discreet zoom steps, 12mm, 14mm, 17mm, 25mm, 35mm or 42mm, whichever one is the most suiting for the FZ200 zoom lens setting.

The values indicated will be one half of the FZ200 lens setting. It will select the largest zoom setting which is smaller than or equal to the lens focal length used.

Zooming can be also done manually; the zooming is done internally with no physical change in size of the unit.

If you have a wide angle conversion lens then you can flip over a wide angle diffuser. This gives you 8mm flash light coverage.

Tilt and swivel

The head can be tilted a little bit downwards, suitable for close-up focus distances. Tilting downwards gives a warning symbol on the display. It can also be tilted 45°, 60°, 75° and 90° upwards.

The head can also be swivelled 30°, 60°, 90°, 120°, 150° and 180° to the left, and 30°, 60° and 90° to the right. The tilt and swivel can be combined.

Tilting upwards or swivelling automatically zooms to 25mm, regardless of the zoom setting on the lens. However, the zoom can still be operated manually.

TTL exposure mode

All modern system cameras are expected to offer TTL flash control these days. In film based camera a small sensor "read" the light reflected from the film and terminated the flash when there had been sufficient exposure. In the FZ200 this exposure determination is done in a different way.

Before the actual exposure, a small pre-flash is done. The pre-flash exposure is read by the image sensor, and used to decide how much flash to apply in the actual exposure.

There is a clear advantage with this solution: The camera can examine the pre-flash exposure thoroughly before deciding upon the main exposure.
In face detection mode, for example, it can take extra care that the faces are correctly exposed.

The "pre-flash" method has a drawback though, it can a bit annoying for anyone being photographed. Also, the pre-flash means that the main exposure is slightly delayed. Not by much, but it could be enough for you to miss a crucial timing.

Auto exposure mode

You can also use the auto mode on The FZ200 camera, in which case it will read the aperture and ISO information directly from the camera.

TTL is usually preferable when using the FZ200 camera, since it usually gives a more correct exposure. You may choose to use auto exposure mode still to avoid the small TTL pre-flash.

The unit also offers full manual control. You achieve this by setting the guide number (from 7 to 80) The unit will show you the maximum distance the flash will cover, given your camera aperture value. You can also vary the power by use of the flash power adjust by up to plus or minus 0.7EV units.
It makes this unit a very versatile additional lighting source, especially if you use an extension cord so you can get the flash unit "off-camera" for better modelling.

Using a compatible TTL extension cord to allow off camera work

Using non-TTL Flash Units

It is possible to use non-TTL flashguns with the FZ200. Most modern flash guns have a low "trigger voltage". This trigger voltage is the voltage which appears at the base of the flash unit and connects with the internal circuitry of the FZ200 camera.
Older flash units were designed for mechanical contacts on film cameras so trigger voltage was not a problem. However with the miniaturisation of the flash firing components within the camera the permissible voltage is much lower.

I have not seen specifications for the allowable voltage of the trigger circuits however I have used guns with 20 volts and have not experienced any problems.
If you want to check the voltage of any of your older units there is a good website which has details of many units.

http://dpanswers.com/roztr/volt_finder.php

These units will have to be used in full manual mode as they will not "communicate" with the FZ200 exposure circuit.

Many of the flash units allow you to set an aperture/ISO value and the unit will automatically expose for these values. Simply set them as per your camera setting.

Sunpak PZ42X (Canon unit) used here in manual mode. Set the iso/aperture to match the camera settings and the unit will auto expose at this level.

Wireless Flash Triggers

If you have a flash gun with a high guide number and other useful features like bounce/swivel but it has a high (more than 30v) trigger voltage it might be cost advantageous to purchase a wireless trigger system. Very cheap units are available if you do not have a lot of use for a more professional set up.

Such a unit is shown below and can be used to trigger multiple receiver units to allow some complex lighting set ups to be constructed using multiple flash units.

Transmitter fits on camera hot shoe

Wireless flash trigger receiver and transmitter unit.

Receiver attached to a powerful Vivitar 283 flash unit with a 260 volt trigger.

The units work over quite a large range (50 metres outdoors). As with

the non-TTL units they again have to be used in the full manual mode.

Most units support both hot shoe and the PC (pronto-compur) cable connections to allow connection to a variety of flash guns.

My National dual head flash gun with side flash bracket used with a PC cable connection to a "hot shoe" adaptor. This unit has bounce facility with lower power – "fill in" flash. A very useful unit for parties etc.

If you use a fixed intensity flash unit where there is no adjustment for output power you will need to use the flash "guide number" to be able to set the camera aperture.

The guide numbers are usually in metres, so for example a flash unit with a guide number of 32 at ISO 100 will give an exposure of the guide number/ distance to subject (in metres).

If our subject is 5 metres away then the aperture is then set to 32/5 which is f6.1. The ISO would be 100.

Most flash units have some form of table which helps you establish the correct aperture for any ISO setting and flash to subject distance.

On the left, the manual flash units table to help calculate the aperture needed from distance and ISO and on the right a non-TTL unit with 2 preset light levels. The ISO is "dialled in" and the scale then gives the aperture to set the camera to.

If you use a wireless trigger to fire these older units it is also possible to use the resulting single flash to "optically" trigger other units if small optical triggering units are attached to them.

The main camera flash cannot be used because of the pre-flash which would prematurely fire the "slave" flash before the main exposure took place.

More video tutorial material on flash:

https://www.youtube.com/watch?v=V79dcaOrS_s

Wide Angle and Telephoto Conversion Lenses

Wide Angle conversion

Although the Panasonic Lumix FZ200 has a reasonably wide angle setting (25mm equivalent) there are times when a slightly wider view would help.

In interior architectural shots, landscapes and group photographs this extra few millimetres of coverage could make all the difference.

Panasonic haven't specifically produced a matching wide angle conversion lens and tube for the FZ200 however there are a number of options you can employ to get wider angle shots.

The weight of the suggested conversion lenses is quite high and a very specific discipline is needed to use them. If you do not follow the discipline you may cause damage to the lens and/or the zoom motor gearbox. I accept no responsibility for any damage to your camera if you want to employ these lenses. I have used these lenses fairly frequently and have had no issues with my camera which has now taken over 70,000 images.

The first option is to use a 0.7x wide angle conversion lens from Digital King. (Available on Amazon, Ebay and other distributors).

It is the Digital King DSW Pro 0.7X It's around £50-£70 in the UK and $80 USA Amazon.

It converts the 25mm setting to 17.5mm. This is quite an improvement yet doesn't put the lens into "fish-eye" category.

If you get the one with a 52mm thread it will screw directly onto the lens of the FZ200.

It has no vignetting as the front optic of this lens is 67mm wide so the camera can be used at its widest angle position thus losing none of the extra field of view.
The lens weighs 76 grams and measures 80mm diameter x 18mm long
It will take 67mm filters fitted to the front of the lens. Do not add at the rear as this may cause vignette to occur.

The Digital King DSW Pro 0.7X Conversion lens

Camera wide angle 25mm

With 0.7x Digital King Adaptor 17.5mm

There is a very small amount of color fringing at the edges of the image, however distortion is well controlled.
The second lens is similar to the Panasonic LWA52 wide angle 0.75x conversion lens. It is a much bigger lens and weighs twice as much as the Digital King convertor.

Minolta ACW100 0.8x wide angle convertor

25mm camera only

With Minolta ACW100 0.8x convertor 20mm

This lens has no color fringing and extremely sharp edge to edge.

The method of use for both of these lenses is as follows:

In the Sleep setting of the Economy mode (page 5 of the set up tools menu) turn this setting to OFF.
Turn on the camera and then screw in the lens, do not zoom or turn off the camera with the lens attached. You can use auto or manual focus as this will not be affected.
When you have completed taking your images remove the lens
Reset your Sleep setting to your preferred value.

Telephoto Conversion

Panasonic do market a telephoto conversion lens and a mounting tube for the FZ200 camera. The lens is the DMW-LT55E and needs the adaptor tube DMW-LA7. The adaptor tube screws into the ring of the lens barrel and then any 55mm close up lenses, or the LT55E lens can then be screwed into the adaptor.

The lens and adaptor fitted on a FZ150 camera

The Telephoto adaptor LTE-55 needs to be used with a DMW-LA7 Adaptor tube

The LTE-55 gives a 1.7x tele-conversion effect with no loss of light.
The weight of the combination can result in a lot of strain on the camera tripod mounting socket.
Ideally the tube should be used to mount the whole assembly to the tripod. *(In the above illustration of the lens fitted on a DMW-LA2 adaptor tube on a FZ150, I used the Canon A-2 tripod lens mount ring – note this ring will not fit the LA7 tube you need the "D" size ring for this).*

Illustration of the X 1.7 magnification of the LTE-55 lens.

In my own testing with the lens, the additional magnification necessitated using a higher shutter speed to reduce blur caused by hand shake.

Given the high price of the lens and adaptor combination plus the shutter speed limitation, I now use x 1.5 digital zoom with almost identical results to the optical magnification for those situations where a slight increase in zoom is required.

You could, of course, do this in post process using a re-size and crop operation.

If you use the lens and tube combination you need to set the lens conversion feature to "tele T" in the set up menu. This sets the zoom to x24 and then limits the minimum zoom to x14 and increases the OIS operation to adjust for more image movement from the increased magnification.

It also sets the minimum aperture to f4 which might be restrictive for wild-life images. (You can ignore using the teleconversion setting and just use manual zoom to overcome the vignetting occurring up to x14.

In this way you will retain the ability to use f2.8, however you may see some loss of edge definition.
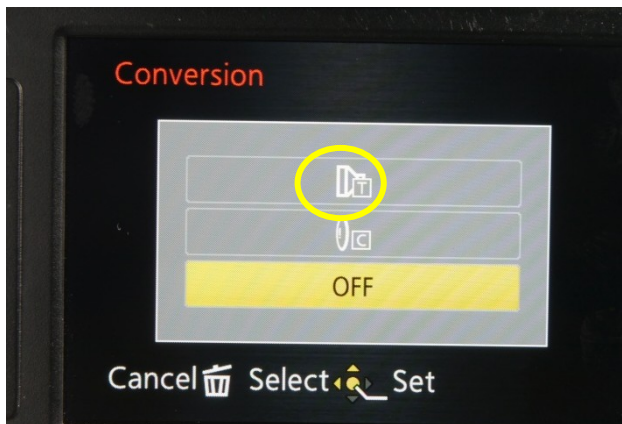
More on using close up lenses and wide angle convertors here:
https://www.youtube.com/watch?v=68cKk32Zlzk

Optical versus digital zoom tested here:
https://www.youtube.com/watch?v=hreRXR1gLiQ

Lighting for Video and Stills Photography

Quite often we will need to add some additional lighting to be able to capture video with enough scene brightness to overcome some of the issues with noise in low light video scenes, especially those with lots of shadow areas.

You can spend a lot of money investing in a whole range of general purpose and specialist lighting units for your video productions.

These can range from simple tungsten halogen lighting units to the latest LED technology units.

Until recently correctly white balanced tungsten halogen lighting was the "standard" for video lighting.
Today we have moved more into a situation where LED technology has matured to a degree where it can be used quite effectively to provide the main source of lighting for a video production.
Basically all white LED's are blue LED's with a coating of a yellow phosphor. This combination allows the manufacturer to produce a LED with a fairly close temperature rating equal to that of daylight at around 5600°K or tungsten at 3200°K by varying the amount of phosphor.

Until recently the spectral emission of these LED's were deficient in red light so there was an issue when trying to capture a scene and maintain good color fidelity.
This low CRI (color rendering intent) has now been addressed by producing LED light panels which have a mixture of LED's in them, white LED's and Red LED's in a ratio to bring the CRI to over 93 in some examples. The closer the CRI is to 100 the better the resulting images are, although the light spectrum is discontinuous and the RGB peaks don't exactly match the filters used over the sensor.

For home or amateur video production either the tungsten or tungsten halogen lights can be used.
The LED's have the advantage that they produce light a lot more efficiently, nowhere near as much infra-red light is produced thus keeping the operating temperature of the LED's and housing units much lower.
LED's have the additional advantage that they can be powered by battery power packs thus making them more suitable to providing a light source where there is no access to mains electrical power supplies.

I have used a variety of lighting methods as shown below for use in table top photography.

120w Tungsten Halogen Flood 700 lux

50W Tungsten Halogen Spot 200 lux

Variable Color LED Spot (3W)

LED 3x 1 Watt 800 lux spot

36 LED 4W (can be ganged together) 280 lux

LED Model 5004 2x 3.5W 600 lux

Color Rendering tests of the light sources.

120w halogen, 610 lux

50w halogen, 235 lux

36 LED x2, 240 lux

3 LED spot 770 lux

Twin LED model 5004 90 lux

Tests using each light source at 1 metre distance. Only light source.

Manual white balance before each exposure. ISO 400, F4

All the 3 LED images look very close to the original; the two tungsten images have exaggerated reds. The lux light meter readings were taken from the scene at each exposure.

There are many different lighting solutions available now using high efficiency LED's. Many have variable dimming facility and are well color corrected. "High end" video lighting is very expensive and is not necessary in most of our amateur needs.

If you are considering investing in professional grade lighting you will soon find the cost of these lights becoming more expensive than the FZ200 camera.

Using the portable 160 LED units now available at £33 in the UK you will find you have enough light for video production as they can produce 900lux at 1 metre, 240lux at 2metre and 120lux at 4 metres.

You will still have to perform a "manual white balance set" operation to achieve better color rendition with all of the light sources shown.

With the FZ200 in manual video mode to achieve a good exposure level using ISO 100 and f2.8 1/30th sec shutter speed requires 300 lux. All the units shown on the previous page (lux measured at 1 metre) will provide this level of illumination at distances of 1 metre (many will exceed this allowing you to move the lights further back, diffuse or dim them if they have that facility)

Using ISO 2000 and the same aperture and shutter speed the camera will record video with as little as 20 lux.
There will be some video noise.
By using manual focus, which enables lower shutter speeds, you can reduce the ISO to achieve better image quality – providing there is no subject movement which will cause blurring at these reduced shutter speeds.

Lighting safety
Remember the tungsten halogen lamps run extremely hot and care should be exercised when using these lamps indoors. Keep away from flammable materials and allow the fixtures to fully cool down before handling to avoid personal injury.

LED lights (particularly the high intensity "Cree" LED) have extreme brightness levels and when used as video lights on top of the camera may cause retina damage if your subject stares into the light.
Try to avoid the lights being "on axis" with the camera lens to avoid such situations if you can.

Using External A/V monitors for live View in Recording mode

We know that the Panasonic Lumic FZ200 has an A/V (audio-visual) port on the side of the camera for playing back stills and video on an external composite audio-video signal into a compatible television, or monitor.

What you probably didn't know though is that there is an undocumented mode which allows you to use the AV out in the camera recording mode.

This facility allows you effectively have a "live view" on a larger external screen.

Using an external monitor for "Live View" using this undocumented method

To activate this undocumented feature connect your external monitor via the composite AV lead (the white/yellow cable). Turn on the camera and then press and hold the "trash can" button for about 5 seconds, or until the external display turns on. The output format can be set to 4:3 or to 16:9 depending upon your monitor type simply by going to the playback menu and selecting the output types (NTSC or PAL and the format).

To turn off the external display, again press and hold the trash can icon for about 5 seconds.

Unfortunately you cannot use this preview mode for video and during an image capture the screen will blank out!

External Microphones Used For Video Recording

When recording video it is essential to a capture good, clean audio soundtrack.

In in-built stereo microphone pair of the Panasonic Lumix FZ200 capture reasonable audio quality when the sound source is fairly close to the camera. Once the sound source is away from close proximity, the camera will tend to ramp up the automatic gain control resulting in "thin" and noisy audio.

If you use the camera outdoors these microphones are very susceptible to "wind noise"

The zoom motor can be heard if you are in a quiet environment and you operate the zoom control.

To overcome the issue of the in-built microphone picking up the noise of the zoom motor Panasonic introduced a compatible stereo electrets condenser microphone the MS1.

The MS-1 external stereo microphone

The MS-1 is powered by a single AAA alkaline battery. Power is applied if you select Mono or Stereo recording and a brief flash of the battery status LED confirms there is sufficient voltage available to power the electret microphone modules.

The microphone features an electronic wind noise filter which can be switched on to attenuate the low frequency rumbling associated with the sound of air buffeting over the microphone capsule. The capsules are mounted on a flexible rubber mount which gives some audio decoupling

of vibration and handling noises. The capsules are covered in acoustic transparent foam which helps to reduce any wind noise.

The microphone is fitted with 2.5mm right angled plug which mates with the 2.5mm remote/mic socket on the front right of the camera. Performance is almost identical to the inbuilt microphones with just the advantage of wind noise and zoom motor noise reduction. The MS1 is an expensive option at around £100 in the UK.

A popular short rifle mic, the Rode Videomic™, can be used with the FZ200 provided you use a 3.5mm female to 2.5mm male stereo adaptor. I recommend that you use a cable version rather than a plug/socket. These can put undue strain on the camera socket.

The Rode Video mic (monaural short rifle mic)

The Rode Video mic is a professional grade ½ inch condenser shotgun microphone. It has an integrated shock mount system to isolate the microphone from handling noise. Powered by a 9v battery it has an attenuator switch which can be set for -10dB or -20dB in very noisy environments such as live music.

It also has a hot shoe mounting foot and ½ and 3/8 mounting holes for fixing on a tripod or mic stand. The audio quality is excellent for interviews where only mono sound is required. A stereo version is available – the Rode stereo video mic. The Video mic is around £80 in the UK. Again the 3.5mm female to 2.5mm male adaptor is needed.

If you want good quality audio for presentations "to camera" then a lavalier microphone is a good choice.

There are many electret condenser types available, some with their own amplifier and others directly connected to the camera.

Lavalier microphone with inline power adaptor

Worn close to the mouth of the user, usually clipped on to the collar of a coat or shirt, held in place with a "tie clip" device. Some are fitted with foam windshields and work well outdoors.

The wired devices can be used with short extension cables up to around 5 metres if screened cable is used to stop interference being picked up by the device.
Samson™ and Sennheiser produce wireless versions.
The Sennheiser mic specifically designed for use in professional broadcast situations.

The Samson Airline Micro receiver mounted on the hot shoe. The transmitter is worn by the user with a lavalier mic attached. The system is monaural.

The ultimate choice of microphone will also be influenced by what is referred to as the "pick up pattern."
Understanding the various pick-up patterns can help you to not only maintain a good volume, but also to avoid picking up unwanted noises that might be present in the room.

Here are some of the most common microphone pick-up patterns:

Cardioid. Named for its heart-shaped pattern, this design is optimal for picking up sound in the front of the microphone. The sides will usually be at about half strength and only one-tenth strength at the back.
This is actually very useful, as all you need to do to reject unwanted sound is have the back of the microphone facing the source of what you do not want to pick up.
This pattern is used for most vocal or speech situations. The Rode Video mic has this pick up pattern.

Omni-directional. This pick up pattern gives the mic the same pick-up strength from all angles. This can be great if you are trying to capture all of the intricate ambient sound in a room.
Most desk and stage microphones fall into this category.

More elaborate microphone set ups can be used and if a mixing console is used then you could take an attenuated output directly to the mic input socket of the camera to record excellent sound quality.

Wi-Fi Cards

The Eye-Fi™ SDHC cards add some extra functionality to the FZ200.
It allows you to wirelessly transfer the images you take directly to your smartphone/tablet/pc over a wi-fi network or transfer your images by wi-fi hot spots to a "cloud" service and download/print them later.

A Sandisk Eye-Fi SDHC card

Newer cameras are now being introduced with wi-fi connectivity for both remote shooting and wirelessly transferring images to other devices.

There is a way to "retro fit" the transfer of images wirelessly by use of the "Eye-fi" sdhc cards available from Eye-Fi or, in Europe only, from Sandisk retailers.

The Eye-Fi Mobi cards are available in larger capacity (32GB) and higher speeds (class 10). Eye-Fi also produce a "Pro" version of the card which allows more connectivity, the ability to upload RAW camera files and "cloud" back up. Sandisk only have 4GB and 8GB cards.

To utilise the transfer facility you will need to purchase one of the cards available, download the "Eye-Fi" app for your tablet/smartphone and create an on-line user account if you are using the Pro card.

The newer Mobi cards will pair directly with your smartphone/tablet after entering the 10 digit pairing code supplied with the card. Older versions will require an account to be set up.

Once the card has been registered or paired with your device as soon as you begin to take images with the FZ200 with the Eye-Fi card installed it will transfer those images to your paired device in around 6 seconds for a full resolution JPEG image.
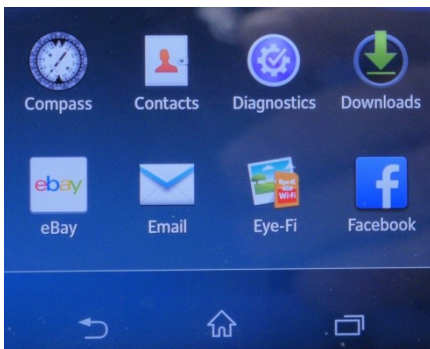
The "app" on an Android device   *Image transfer taking place*
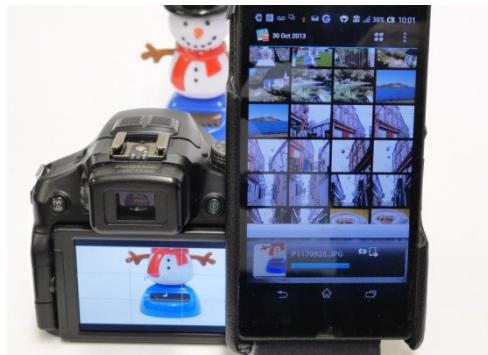
If you download the Eye-Fi control centre onto your PC/MAC you will be able to access and control additional facilities.

You can have the card utilise your "Home Network" or start the "Direct" connection method to transfer the images.

You can also have the card become an "Unlimited Storage" device.

In this mode the card will transfer and then erase the images on the card (when the capacity limit that you set has been reached) – thus you can shoot continuously both stills and video (up to 2GB in file size) and have the card transfer these in the background to your paired device/cloud service.
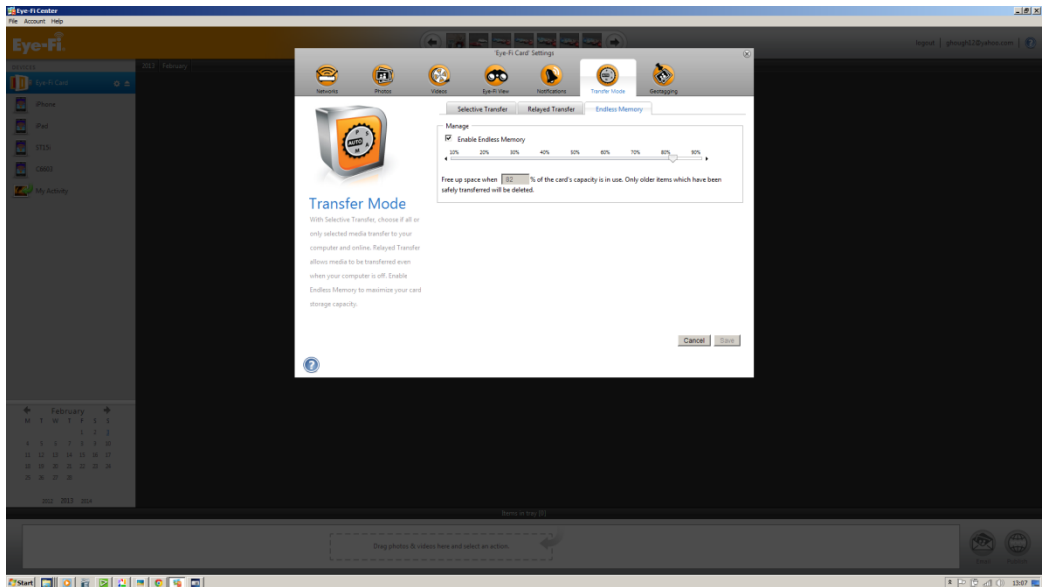
The Eye-Fi control panel on a Windows PC

Once you have the Eye-Fi card you can use it in several cameras and pair it with other devices as well.

You can manage all the connections through the control panel.

To find out more on this facility – see my video review of the Eye-Fi SDHC card:

https://www.youtube.com/watch?v=Dqg6W4ktN6s

Tools Menu Setup Options

In this section it's time to take a look at some of the options in the "tools" set up section of the main camera menu.

The "Tools" set up section of the main menu.

On the first page of this menu we have the clock setting option, which is the first menu you are presented with when you initially turn on a new camera.

The Beep option allows you to control the volume and tone of the sound when scrolling through menus. This can be set to OFF or set to one of two levels.

Shutter Tone and Volume allow you to change the sound of the shutter firing and the volume from OFF to high again in two increments.

The World Time allows you to set your camera to local time if you travel away from your country and need to adjust the day/date to the travel destination.

Travel Date allows you to enter a departure and return date as well as a destination. During replay of the images this information is displayed along with the image.
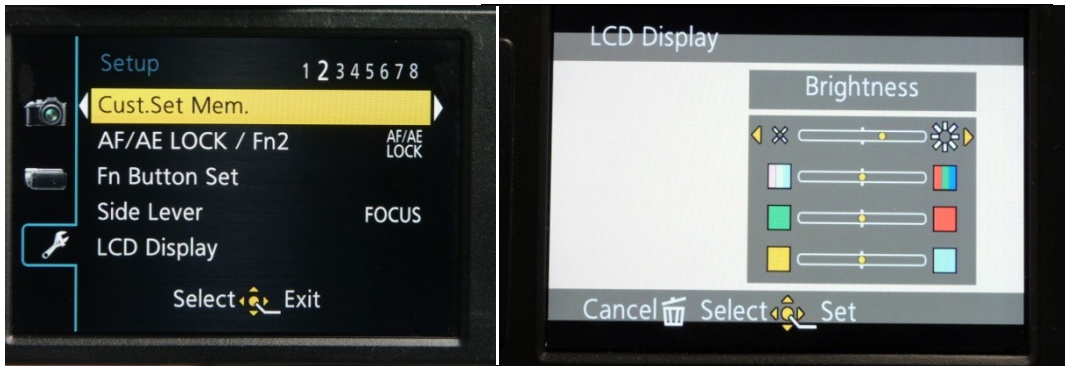
On page 2 of the set up menu we have seen the functionality of the function buttons and the option to program the lens side lever as either focus or zoom.

The LCD Display option allows users to customise the way the LCD screen is calibrated. It allows the Brightness, Contrast/Saturation and Color tints to be adjusted if you feel the display does not accurately match the illumination of the subject.

However if you adjust this too far from its default you may begin to make adjustments for exposure which are being biases by this display offset.

LCD Display style, data in border

The LCD Mode allows the brightness of the LCD display to be controlled by the ambient light levels or switched to a low or high intensity mode. The high intensity mode is useful if using the LCD in bright sunshine.

The EVF and LCD Display Styles allow you to set the way that exposure and other displayed information are presented. It can either be superimposed on the lower part of the image or in a black border at the bottom of the image. The superimposed view gives you more image size to evaluate focus etc.
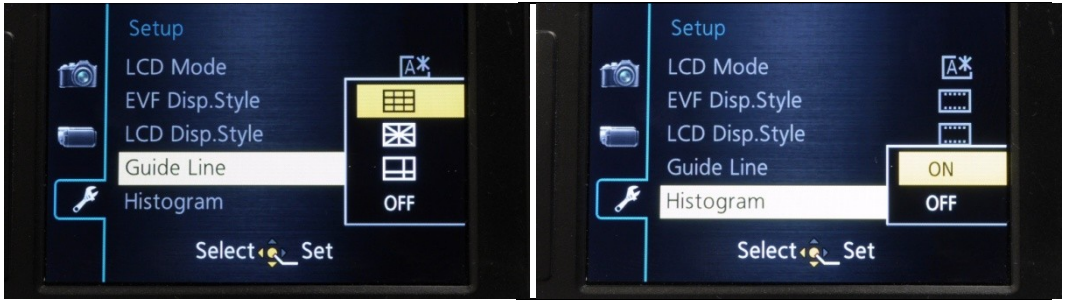
The Guide Line option allows you to select a display overlay which is useful for such things as getting your picture composition stronger by using the "rules of thirds" grid lines (the top selection).

The lower grid line option allows you to set the horizontal and vertical positions of two guidelines which are displayed.

Reading Histograms

The Histogram feature is useful for displaying the distribution of image tones (brightness values).
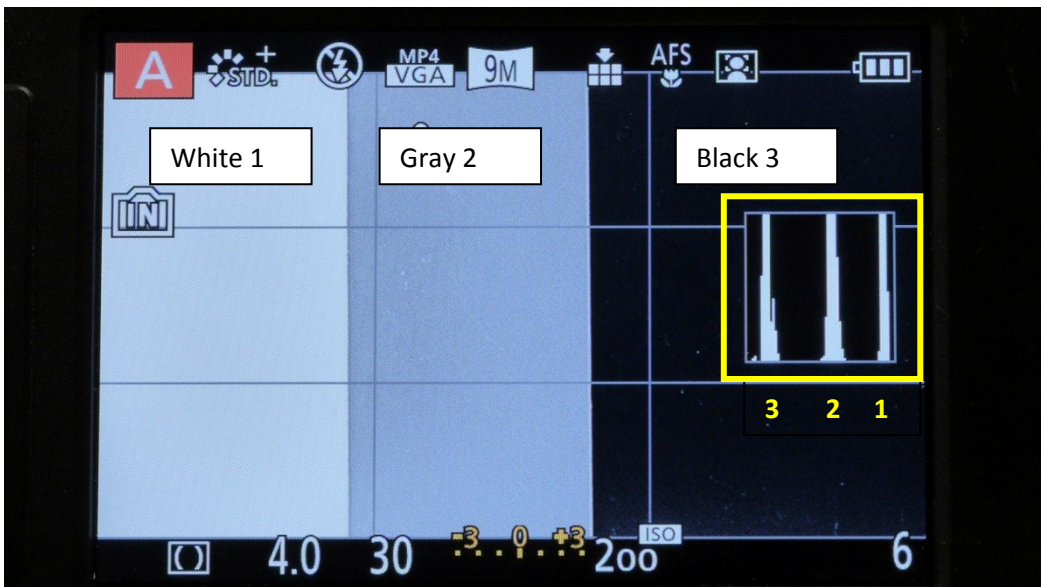
The Histogram, shown above, displays the brightness tones in the image from black on the extreme left (3) through mid gray (2) in the centre and whites (1) on the right hand side.

The height of the bars indicates the number of pixels in that range.

Here in this example of a "high key" image where there are more areas of white in the image the "skew" of the histogram is more towards the highlight end of the chart.
The histogram only displays the distribution of pixel values in the scene to be photographed; you still have to interpret the indicated result.

Here in Aperture priority mode with -4/3 EV you can see the light areas are not aligned with the right hand side giving an indication of underexposure in the image.
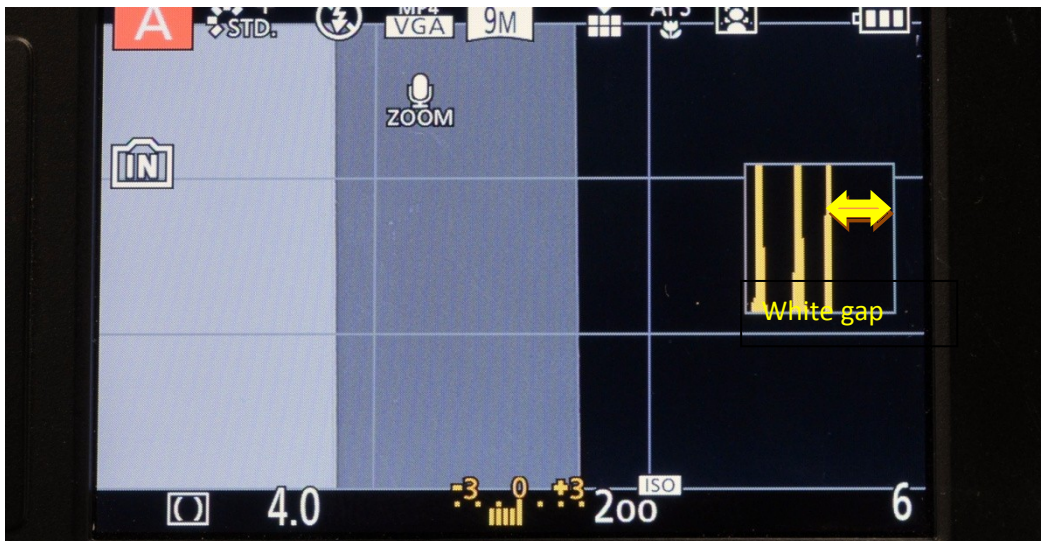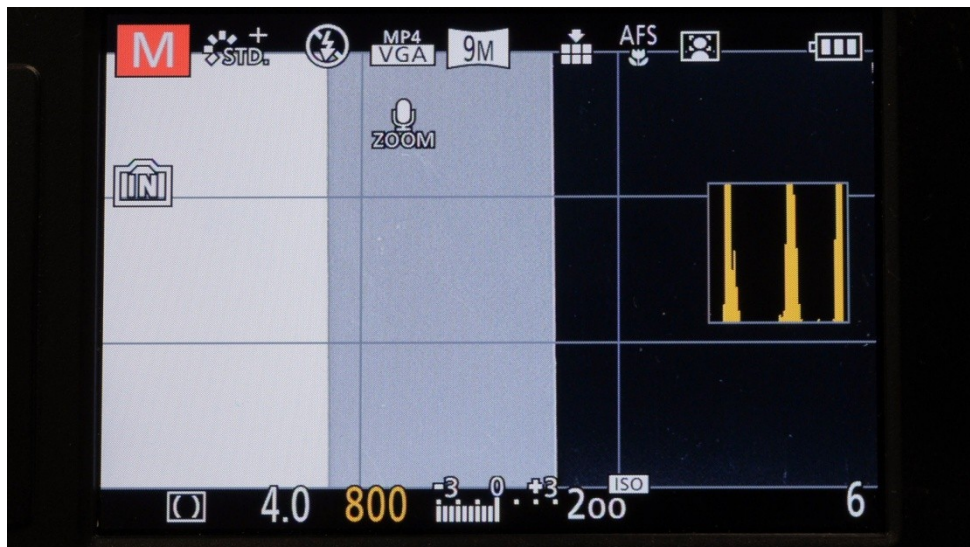
Here, with the camera in Manual mode, the histogram looks to be displaying a perfect exposure whilst the exposure meter is showing the image to be very much underexposed.

If you half depress the shutter button you will see the "live view" of the way the image will be taken with the whites and mid tones crushed into the blacks. Compare this with the manual exposure set correctly.
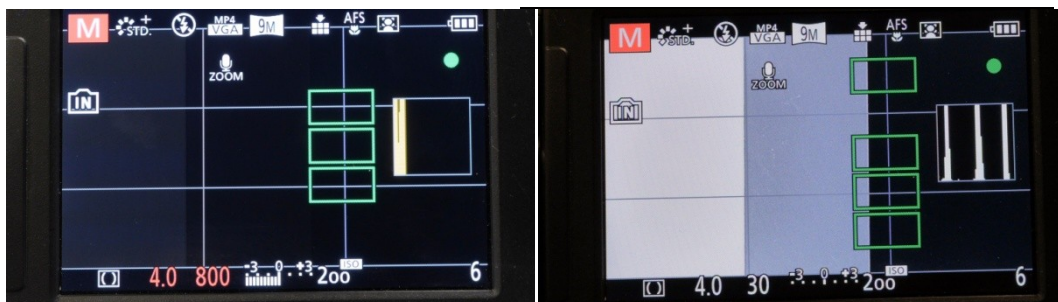
So as you see in the Manual mode the histogram is only showing the distribution of brightness values and not how they will be recorded!
You can become fairly quickly skilled in reading a histogram and how the different lighting contrast levels affects the way the "skew" of the curve looks.
Thankfully we have an immediate display of the recorded image now as soon as the image has been captured and we can evaluate the exposure directly.
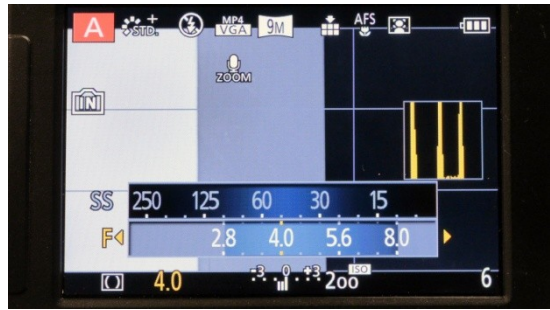
The Exposure meter display

On page 4 of the "tools" menu we have the options of:

Video recording Area - This outlines, on the LCD display, the area which will be recorded in video mode. There is always a slight crop of the image when the camera starts to record video and by having this set to on you will be able to preview exactly what will be cut off around the edges of the frame.

The Remaining Display - can be set to either show the amount of space for still images or the video recording time available on the SDHC card in the camera.

The Highlight - function when set to "ON" will indicate on the image any areas of the image where the highlight detail has been lost.
In such a situation you can then judge whether the loss is acceptable or adjust your exposure to compensate.

The Exposure meter - display option superimposes a dual scale showing aperture and shutter speed. It gives a quick visual indication of the aperture/shutter speed combinations which could be used for this exposure. Any combinations which are outside the aperture or shutter speed range will be indicated in red.

The Lens Resume - option allows you to set up the camera so that after a "sleep" mode, or turning the camera off and on again, the previous lens zoom position will be recalled.
You can also set MF, manual focus, resume as well. This is ideal if you set up your camera using my "hyperfocal focusing" method so that if the camera is turned off or enters sleep mode it will return to exactly the same settings as previously before the camera was turned off or went into sleep mode.

On page 5 of the "tools" menu:

MF assist - set to "ON" will allow the camera to magnify the area set up as the target thus allowing you to set critical focus when using the manual focus method.

The Economy Mode - allows you to set the time before the camera goes into its "sleep" mode, and/or set the interval before the LCD backlight turns off to preserve battery life.
There is also an option to apply an ECO mode to the LCD when in "live view" to preserve battery life however this results in lower image quality but does not affect the recorded image.

Play on LCD when set to "ON" will force the camera to playback images on the LCD even if you have selected the EVF as your main viewing device.

Auto Review - allows you to display the image just acquired for 1 or 2 seconds or to "hold" it until you next press the shutter button. You can also turn off the feature.

No. Reset - is there to update the "folder number" and the file number to 0001. Each folder holds 999 images after which the folder number increments by 1 and the file number starts again.
This can be useful if you want very discrete image sequence numbers rather than just incrementally camera generated ones.

The Folder and File number combine to give the image number, for example 119-0025 is jpeg image 1190025.

If you never reset the numbering sequence it gives an indication of the number of exposures that you have completed with the camera.

The camera starts numbering from 100-0001 so after each 1000 images the folder number will increase to 101-0000 and so on.
My present image sequence is 119-0005 which means the camera has taken 19,005 images in its lifetime.

The folder number can be assigned between 100 and 999.
When the folder number reaches 999, the number cannot be reset.
To reset the folder number back to 100, format the built-in memory or the card first and then use this function to reset the file number.
A reset screen for the folder number will then appear. Select [Yes] to reset the folder number.

The Reset option on page 6 is a way of reverting the camera back to factory defaults for the REC mode and the SET UP menu items.
The option has two parts, the REC mode where all the settings are restored to default, apart from time and date and the Folder/File number.
The second is the Set up parameters which include the Custom memory profiles, face recognition and the Lens resume settings.

The USB Mode - allows you to "Select On Connection" either a PC or PictBridge(PTP)]if you connect to a printer supporting PictBridge.

PictBridge(PTP): Set before or after connecting to a printer supporting PictBridge.

 PC: Set before or after connecting to a PC.

Output - specifies the video standard and aspect ratio
Video Out: Set to match the color television system in each country.
NTSC: Video output is set to NTSC system.
PAL: Video output is set to PAL system.
This will operate when the AV cable or mini HDMI cable is connected.

TV Aspect: Set to match the type of TV.
16:9: When connecting to a 16:9 screen TV.
4:3: When connecting to a 4:3 screen TV.
This will work when the AV cable is connected.

Vierra - link allows the control on the camera playback through the Vierra™ interface standard on Panasonic Televisions via the HDMI cable between the two devices.

3D - playback allows users to specify how the 3D files created with the camera are displayed on a 3D or a conventional 2D Television.

On page 7 of this menu we have:

Rotate Display - This mode allows you to display pictures vertically if they were recorded holding the camera vertically.
On: Rotate pictures on a TV and the LCD display so that they are displayed vertically.

External Only: Pictures are displayed vertically by rotating when played back on TV.
Scene Menu - Set the screen that appears as you switch the mode dial

to the SCN position.
AUTO: Display the Scene Mode menu to allow you to select.
OFF: Display the screen of the currently selected Scene Mode.

Menu Resume - The last operated menu position is saved even if the camera is turned off, when you next access the menu it will return here.

Version Display – Displays the current firmware revision number of the camera.

Format – allows the built-in memory or card to be formatted. Formatting irretrievably deletes all the data from the card and then builds the folders that the camera requires.

On the final page is the option to set your native Language and in the Demo mode see how the OIS works.

The End Of The Book But Just The Beginning!

I hope that this guidebook, based upon my experience with the Panasonic Lumix FZ200, has been useful in some respect.

The Panasonic Lumix FZ200 is a fantastic camera.

It is by no means a professional camera however it is capable of delivering spectacular stills and video performance and given its total convenience over DSLR systems one which will allow you to develop your picture taking for many years to come.

I will endeavour to continue to update either to this guidebook or the "hints and tips" cards available at:

http://www.grahamhoughton.com/download-section/

If you would like to leave any feedback on this book you can leave a comment here on my Youtube™ channel discussion page.

http://www.youtube.com/user/ghough12/discussion

Image Gallery

A few sample images taken with the Panasonic Lumix FZ200.

Table of Indexes