Does the Intel® Pentium® 4 Processor really make a difference?

Yes.

A Complete Guide to Digital Photography on a PC

How to choose the right digital camera
Computers for digital photography
Tips for taking better digital photographs
Printing, printers and photo paper
Digital imaging software
Digital photos for e-mail and the Internet
Digital camera features and functions
Photo techniques for great images

www.intel.co.uk
Welcome to Intel’s

Digital Photography Made Easy Guide

When you switch from traditional film-based photography to the exciting world of digital photography there are a number of choices awaiting you. The best part is that the switch to digital has never been easier. This is thanks to the amazing processing power provided by the latest Intel® Pentium® 4 processors. Processing power for the average home computer now provides fantastic computer performance. This delivers unrivalled creative opportunities by providing a digital darkroom and imaging hub on your desktop at home.

The Intel Digital Photography Made Easy Guide is designed to help you understand the terms associated with digital imaging. As you progress through the easy-to-follow articles you will soon be comfortable talking about and working with gigahertz, gigabytes, megabytes, megapixels, compression formats, zooms and image manipulation. More importantly, the guide has been designed to help you make an informed buying decision.

You’ll soon find that the Intel Digital Photography Made Easy Guide will prove to be an invaluable resource. It pulls all the technology jigsaw pieces together in a simple and easy to understand way. The guide not only includes the important technical aspects of understanding a digital camera, it also provides a comprehensive understanding of the creative aspects of digital photography thanks to the helpful hints and tips provided throughout the guide.

There are a lot of great reasons to make the shift from traditional film cameras to digital cameras.

And the PC is at the centre of the digital revolution. Thanks to its role as the digital hub it has allowed new technology like digital photography to become affordable, accessible and infinitely more creative than film.

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Taking The Digital Leap

The move from traditional film-based photography to digital imaging is an exciting leap. Thanks to the power of the Intel® Pentium® 4 processor-based PC and a huge range of creative software, digital photography can be an incredibly satisfying and creative adventure.

Why You Need A Fast Processor

Digital imaging presents demands for both the PC’s operating system and processor, which have to deal with the hundreds of thousands of pixels at every minute change of the image in your digital darkroom.

Using the latest Intel Pentium 4 processor-based PC or Notebook with Mobile Intel Pentium 4 Processor - M technology ensures that you spend more time creating and less time waiting. With the newest PC as the hub of your desktop digital darkroom you can develop your creativity to its full potential.

Even if you’re new to digital photography you will soon find that a PC allows you to manipulate and enhance your images, print your work as high-quality photographs, publish to a worldwide audience via the Internet, create slide shows for viewing on a computer monitor or TV and even distribute to a broad range of contacts via e-mail. The PC has delivered a new world of image sharing from next door to across the globe.

Film processing labs, realising the huge growth in digital imaging fuelled by the increase in the power of the PC, are now working with the IT industry to provide PC users with even more creative options.

Digital photography is the natural evolution from film-based imaging that has been around for over 130 years. In many ways analog and digital photography are very similar. The key difference is that images are not recorded on film, but as digital information stored in one type of “memory” or another. And, once the images have been copied to a computer, the photographer gets to re-use the “digital film” again and again.

Enhanced multimedia support for image processing

Unmatched processing power for rendering digital image effects

Improved Web performance for sharing images on-line

The ability of image editing software to take advantage of the power of the Pentium 4 processor offers greater creative potential

RAM

Along with the processor’s speed, the amount of RAM in your computer is important for successful image manipulation. RAM (Random Access Memory) stores the data used when applications and files are in use on your computer. All the data held in the RAM is lost when the PC is shut down.

RAM affects everything you do with digital imaging. In general, the more memory you have installed, the faster the image editing software and all the utilities associated with it will perform.

Because digital image files are enormous when compared with word-processing documents or database files, creative workstations require much more RAM than would be needed in a general-purpose computer.

Today, RAM is relatively inexpensive, so it is worth configuring your PC with as much RAM as possible. A good starting point is 256 MB (megabytes) but, if your budget can extend to 512 MB or more, you will really notice the difference.

Image Performance

Adobe® Photoshop® v7.0

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<th>Processor Speed</th>
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<tr>
<td>500 MHz</td>
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<tr>
<td>2.0 GHz</td>
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<td>2.53 GHz</td>
<td>47% Faster</td>
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<tr>
<td>3.06 GHz</td>
<td>39% Faster</td>
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Performance measured relative to Pentium III processor 500 MHz

Digital photography requires a computer system with an Intel® Pentium® processor of 800 MHz or higher with a dedicated video card. When configuring your system you want to ensure there is sufficient RAM to handle the image data. Many image editing programs have a minimum RAM requirement to start.

Optimising a PC for Digital Photography

The PC has become the digital imaging hub, making digital photography an immensely creative experience. With the right PC solution, your desktop can easily become a virtual darkroom.

Intel® Pentium® 4 Processor and Digital Photography

At the very heart of modern digital imaging is the PC. It has become the hub for the desktop digital darkroom where images are captured and edited, then published and distributed to the world. Without the processing power and easy connectivity found in the latest PCs, digital photography could not have grown as rapidly and successfully as it has in the past few years.

As the size and quality of photographs taken with digital cameras has increased, they have been matched by overall performance and power improvements in the PC. The latest Intel Pentium 4 processor-based PCs and Mobile Intel Pentium 4 processor - M based Notebooks are ideally suited for digital imaging. They make the creative process of image manipulation and enhancement much less time consuming.

Processor Performance Enhances Digital Photography

When working with images, the computer’s processor works like an engine, crunching calculations at lightning speed. When you add software that manipulates the image in your PC – creating a digital darkroom – processor speed becomes absolutely critical.

The reason digital imaging needs the fastest processor speed relates directly to the way images are constructed. A digital picture is made up of pixels (the word “pixel” actually stands for picture [pix] element [elt]). A pixel is simply a tiny square of colour; a digital image can be made up of hundreds of thousands or even millions of pixels.

When a digital photograph is snapped, the light captured by the image sensor is converted into pixels. Each pixel represents a certain colour in general the more pixels you have in an image the sharper it will be. The pixels that make up the digital image are stored as data on your camera’s memory card. When the image is transferred to a PC, it is the combination of these pixels that appears on the screen.

When the image is opened up in an image editing software program, the PC’s processor speed comes into play and the fun begins.

The moment you start adjusting the image, the computer’s processor must make millions of calculations per second to change the way every pixel in the picture appears.

A simple task such as changing the brightness or contrast, adding filters, sharpening the image, or adjusting the colour saturation of the picture requires every individual pixel in the image to be altered. Even on simple images, this requires hundreds of millions of calculations to be made before you can see the adjustment on your computer’s monitor. Therefore, processor speed is absolutely linked to the performance of your desktop digital darkroom.

The ideal PC to work with digital images should be equipped with the fastest Intel Pentium 4 processor available.

Enhanced multimedia support for image processing

Unmatched processing power for rendering digital image effects

Improved Web performance for sharing images on-line

The ability of image editing software to take advantage of the power of the Pentium 4 processor offers greater creative potential

System configurations located on page 31 of this guide.

Intel Pentium 4 Processor Imaging Performance

“A picture is worth a thousand words”. This is why sharing images has become such an important aspect of computing today. With image modifications using Adobe® Photoshop® v7.0 it’s easy to see the performance benefits that can be obtained with the Intel Pentium 4 processor.

Intel Pentium 4 Processor Imaging Performance

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Performance measured relative to Pentium III processor 500 MHz

Hyper-Threading Technology requires a computer system with an Intel® Pentium® processor of 800 MHz or higher with dedicated video card. System configurations located on page 31 of this guide.
Optimising a PC for Digital Photography

Removable Storage

Image files are generally so large that they have made floppy disks all but useless as a way of transporting pictures to another computer or for sending images off to a photo processing lab for specialist printing. A popular transfer option is a CD writer and rewinder – available as either internal or external models. A CD-R can hold from 650 MB to 700 MB of data, making them by far the cheapest way to store and transport images.

DVD writers are also becoming popular as prices drop. DVD-R discs store 4.8 GB of data. Most DVD writers will also write CD-R and CD-RW (CD rewriteable) discs.

Another alternative in removable storage is an external FireWire or USB compatible hard drive. This is simply a regular desktop or notebook hard drive that can be plugged into a PC's FireWire or USB port. Data or images are transferred to or from the external drive in much the same way as the computer's internal drive. This is often used as a backup or as a means of transporting a large number of image files between computers.

Graphic Card

A 16 MB or 32 MB graphics or video card is enough to provide the screen resolution and refresh rate you'll need when working with complex images.

Graphics Tablets

A comfortable ergonomic keyboard is especially useful. However, most digital imaging work is done with a mouse. A comfortable, quick-moving, fast-reacting mouse is very important if you intend to be doing a reasonable amount of image editing in your PC’s digital darkroom.

Keyboard, Mouse and Graphics Tablets

The latest optical mice are ideal for graphics and image editing work. Some users prefer a trackball system, where the on-screen cursor is moved by rolling a large ball with your palm.

If you are doing fine work, such as tracing around elements in an image, correcting faults or painting on your image, then consider a pen-based graphics tablet. These are much more accurate and natural when compared with a mouse.

Graphics tablets are pressure sensitive – they literally feel the full range of pressure from the pen on the tablet. With a pressure-sensitive tool, such as Photoshop’s Rubber Stamp or History brush or any Painter brush, you get incredible control. It's more intuitive than a mouse because it's how tools work in the real world. It has the effect of turning your computer screen into a palette.

If you spend any time at all creating graphics on a computer, a graphics tablet will help you work faster. You can literally go from light to dark, thin to thick, or opaque to transparent in a single pressure-sensitive stroke.

Hard Drive

When images are transferred from your digital camera to the PC they are stored on the computer's hard drive. The hard drive stores an enormous quantity of data, all the documents, applications and image files that you work on.

If you are planning to store lots of image files on the computer's hard drive, size is really important. The average hard drive today is 40 GB (gigabytes). However, you can have your computer configured with a larger hard drive – 60 GB or 80 GB - if you are really serious and expect to be working with lots of images.

It is also important to consider the spin speed of the hard drive. Quick spinning drives (7,200 rpm) allow data to be read and written faster – the higher the rpm, the less time it takes for the drive to read or write a given amount of data. This allows you to work at optimum speed.

Monitor Settings

Setting up your monitor for optical image display is important and relatively simple. Go to: START > SETTINGS > CONTROL > PANEL > DISPLAY > SETTINGS.

Set Colours to TRUE COLOR 24-bit and the screen area to 800 x 600 or higher.

You can alter the screen resolution of every monitor so that icons and menus are at a comfortable viewing size. Screen resolutions are measured in pixels such as 640 x 480 (VGA), 800 x 600 (SVGA), 1024 x 768 (XVGA) and above.

CD-ROM, CD-R & CD-RW

One of the handiest peripherals to have on your PC is a CD writer or ‘burner’. Currently the industry standard is 32x write, 10x rewrite and 40x read - you see this in the CD drive's specifications as 32x/10x/40. SIEHE S6

In addition to your read-only drive, a burner lets you store images easily and relatively permanently, plus you can store professional presentations, portfolios and multimedia packages on a CD.

One of the most important aspects of burning your photos to CD is that it is an inexpensive way of archiving all your precious photographic memories.

Monitor

The monitor you select for your PC is very important. The monitor displays your image, so it needs to show you sharp colour-corrected images for you to work on.

The general rule of thumb with monitors is that bigger is better. Image editing programs generally have lots of tools, palettes and menus and these occupy a great deal of desktop space.

There are two types of computer monitor to consider – LCD or CRT. LCD monitors are completely flat and very thin, taking up around 20 percent of the space of a conventional monitor. The downside is that you’ll pay between double to triple the price of a conventional monitor.

Make sure the LCD monitor you buy is a TFT (thin film transistor) type – these offer the widest viewing angles. TFT monitors show more screen than CRT monitors, so you can easily do image work on a 15-inch or 17-inch LCD monitor.

Modem

Virtually all new PCs now come standard with a 56 K modem. However, there are two things to remember. First, your ISP must be capable of connecting you at 56 K, and your telephone line also needs to be compatible.

Newer, faster choices are available in modems, such as ADSL, and Cable modems. If you are serious about moving larger files via the Internet and e-mail you should consider broadband.

Ports

USB has become the common connecting port for all digital cameras available today and any new PC will come with multiple USB ports. If you find that you are running out of USB sockets, a USB hub can add several connection points to a single socket.

DVB-ROM & DVB-R

Most of the name-brand DVB-R drives can be configured with a PC when it is being built. One of the better options at the moment is Sony’s DVB/CDWR Writer. This is very reliable and will burn DVB-R photo albums that can be viewed on a domestic DVD player.
In digital photography, the memory card has replaced film. The advantage of a memory card is that images can be viewed immediately after they are taken, then retained or erased and reshot if the image isn’t exactly as the photographer wanted. Captured images are easily transferred from a memory card to a PC, either directly from the camera or using a peripheral card reader attached to the PC.

There are several memory card formats currently used for digital still cameras. The following overview of the different cards may help you decide which camera is the right one for you.

### Memory Type: CompactFlash (CF)
- **Used for example in Olympus* E-20P.**
- The CompactFlash cards are about one-third the size of a PCMCIA card and less than half the thickness, yet they offer similar ATA functionality and compatibility. It’s this small size that has made CompactFlash the most popular type of flash for digital cameras.
- CompactFlash cards come in two sizes, type I and type II. The type II cards are larger and can contain the IBM* microdrive, which holds 340 MB or 1 GB.
- CompactFlash type I cards are small (43.0 x 36.0 x 3.3 mm), roughly the same size as SmartMedia cards, only 4 times as thick. CompactFlash cards will operate at both 3.3 V and 5 V unlike SmartMedia cards.

### Memory Type: Microdrive
- Can be used in Olympus* C-5050 Zoom for example and any camera supporting CompactFlash Type II.
- One of the most impressive digital camera storage solutions at the moment is the IBM* microdrive. The microdrives, currently available in 340 MB and 1 GB, are extremely small-sized hard disks that can fit in a CompactFlash Type II memory slot. These drives allow digital cameras with CompactFlash Type II support to break through the frustrating memory barrier many users face when dealing with high resolution uncompressed images.
- On the downside, this is a hard drive storage solution, with all the inherent problems with regards to issues associated with stability and ruggedness. The sort of rough handling that may be OK for a Compact Flash card, SD card or Memory Stick is not recommended for a Microdrive.

### Memory Type: xD-Picture Card
- The xD-Picture Card, a new standard of ultra-compact memory media developed jointly by Olympus Optical Co., Ltd and Fuji Photo Film Co., Ltd., with a volume of 0.85 cc and a weight of 2 g, the xD-Picture Card boasts the smallest form factor of any digital memory card, making it exceptionally portable and convenient. The miniature size of the new card will enable development of even smaller digital cameras.
- xD picture cards have fast data transfer speeds. xD-Picture Cards hold capacities of up to 128 MB. By end of 2002 they will also be available with 256 MB, yet the new standard has been created to potentially support capacities up to 8 GB. Thanks to unique adapter solutions (PC Card adapter, USB Card reader and CompactFlash adapter) xD-Picture Cards can work with most digital cameras and other multimedia devices.

### Memory Type: Memory Stick
- Used in all Sony* Digital Still Cameras.
- Designed for use with both PC and a wide variety of digital AV (audio/video) products, the Memory Stick can be used to store, transfer and playback AV content such as images, sounds and music, as well as information including data, text and graphics.
- Sony’s Memory Stick digital storage media, which is no larger than a stick of gum, is about 1/8 the size of a regular floppy disk and is currently available in 4 MB, 8 MB, 16 MB, 32 MB, 64 MB and 128 MB.
- The Sticks can also employ an authentication technology. Protected content is recorded and transferred in an encrypted format to prevent unauthorised copying or playback.
- At the moment, only Sony* has provided any products that support Memory stick, although several companies have expressed interest in the technology.

### Memory Type: Smart Media Cards
- Used in all Sony* Digital Still Cameras.
- Can be used in Olympus* C-5050 Zoom, SmartMedia cards are also known as solidstate floppy disc cards (SSFDC).
- SmartMedia cards are very small, roughly the size of a matchbox and around the same thickness as a credit card. They are also very light, weighing in at 2 grams. SmartMedia cards come in two voltages, 3.3 V and 5 V. The 3.3 V cards have a notch on the right side, the 5 V cards have a notch on the left.
- SmartMedia cards contain a single flash chip embedded in a thin plastic card. A floppy adapter can be used to input images from the card straight into the PC’s floppydrive.

### Memory Type: Multimedia Cards (MMC, SMMC, SD)
- MultiMediaCard (MMC) memory cards use a similar technology to SmartMedia cards at about half the size. MMC is at present available in a few flavours. The differences are mainly in the level of content security and write protection.
- Secure Digital (SD) memory cards provide a more secure way for you to distrib-ute your files than Smart Media, Compact Flash or normal MMC, and are available in 16 MB, 32 MB and 64 MB capacities.
- Secure MMC (SMMC) is another format similar to SD. MMC cards are increasingly being used in DV camcorders to provide a digital video storage solution as well as a digital still storage solution.
Megapixel

What Does it Mean?

When comparing digital still cameras based on resolution alone, you are left with a similar problem to anyone wanting to buy a colour printer or scanner.

Resolution is important, however there are many factors that affect camera quality and output. Perhaps the most critical guide to a digital camera’s image performance is the pixel rating of the charge coupled device (CCD). The manufacturers try to be the first with a camera that has the highest pixel count (and therefore highest perceived quality) on the market. Printer makers went through a similar process with a ‘dots per inch (dpi) war’, trying to be the first to market with 360 dpi, 720 dpi, 1440 dpi and so on.

Eventually, the industry tried to standardise what a dot meant and, in the end, consumers became experienced enough to make buying decisions based on how the print looked rather than being too concerned with dpi claims.

What Is A Pixel?

Pixel is simply a combination of the words “picture” [pix] and “element” [el]. Therefore a Pixel is the most basic component of a graphic image. A collection of Pixels arranged in a grid or matrix forms a digital photograph.

Think of the pixel as a basic building block, with each Pixel contributing to the creation of a graphic. Whether you are working on a simple scanned image, or watching the latest movie, look deeply enough and you will come down to a single Pixel.

The quality of a Pixel

If the image to be created is in black & white, each Pixel can be represented by 1 bit; a “1” if the Pixel is black, or a “0” if the Pixel is white. When the computer opens a black & white bitmapped image, every time it comes to a “1” it draws a white Pixel, and every time it comes to a “1” it draws a black Pixel.

If you need to create complex or high quality images you may need more than 1 bit per Pixel. If you are going to work with colour images you definitely need more information in each Pixel.

The term Pixelation applies when individual Pixels can be seen with the naked eye. This usually means that the Pixels in an image lack sufficient information to be seen realistically.

Resolution

Resolution is another crucial piece of the image quality puzzle, and this refers to the number of Pixels in a defined area. The most common area measured is an inch squared – however, centimetres are also used. Resolution is used to describe the total number of Pixels on a monitor. Resolution is usually measured in dots per inch (dpi).

Most monitors display an image at 72 dpi, which means that graphics created for the Internet are mostly created at the same resolution. Monitors come in a variety of resolutions from 320 x 200 pixels to 1600 x 1200 pixels.

Printers can also print at many different resolutions, from 128 dpi or less, to 300 dpi on inkjet printers, 720 dpi on laser printers and up to 2000 dpi on high quality typesetting printers.

Bitmaps Explained

Bitmaps are created through the ordered sequence of bits that get drawn on the screen. You generally create a bitmapped graphic using programs such as Photoshop. Any bitmapped image will eventually look pixelated as it is enlarged. For example, an image created in Photoshop that is 4 inches by 6 inches at a resolution of 72 dpi and printed at 8 inches by 10 inches at 300 dpi will result in a very pixelated print.

Bit Depth

Bit depth is the number of bits used to store information about each Pixel. The higher the depth, the more colours stored in an image. For example, the lowest bit-depth, 1-bit graphics are only capable of displaying 16 colours because there are 16 different combinations of 4-bits.

8-bit colour provides a total of 256 colours available. 16-bit colour provides a total of 65,536 colours. 24-bit colour provides a total of 16,777,216 colours.

There is often confusion regarding which bits are being referred to, as many people talk about an image and the monitor in the same sentence. When it refers to the bit depth of the monitor, it means that your monitor is able to show a certain number of colours at one time. If it is meant as the bit depth of an image, the image may contain the specific number of colours.

In a perfect world with all users having the fastest hardware and broadband connections, all images would be the least 16-bit or better. Unfortunately, the higher the bit depth, the more bits per Pixel used in an image, the larger the actual file. This means longer downloads over the net or a longer wait to print out an image. Therefore, anyone working with images wages a constant battle to balance image quality with file size.

Exceptions To The Rules

There are some exceptions to general conventions. Photoshop now works effectively with vectors and type (Photoshop 7 even works with natural brushes).

Hints & Tips

Remember the use of digital zoom will reduce the quality of your image by enlarging the image. If you need to compose your shot, move closer to the subject and turn your digital zoom off to ensure that you get the highest possible quality.

Also, take your shot at the highest resolution possible. This will allow you to resize your image on the PC with less pixelisation.
Digital camera lenses must be produced to extremely high quality standards. As well as being smaller and generally having much higher resolution than their analogue counterparts, digital camera lenses usually boast considerably better light-gathering properties. And for complete precision, values for focus, white balance and light metering are measured TTL (Through-The-Lens) by some advanced models, too.

Shutter Release and Zoom Lever
Besides triggering the release, focus and exposure readings can be locked on a subject by pressing the shutter release button halfway down on most cameras. This allows subsequent reframing of the scene utilising the saved values. On this camera, the integrated lever provides control over the zoom factor – and in playback mode allows index viewing and zooming-in on the image displayed on the camera’s LCD monitor.

Flash
Various flash modes give extra flexibility for shooting in a wider range of situations. For example, Red-eye Reduction minimises the red-eye effect by emitting a rapid series of pre-flashes prior to the main flash. Meanwhile, with First-curtain slow Synchronization, the flash fires at the beginning of a long exposure shot to produce interesting effects to denote movement.

Remote Control Receiver
As well as incorporating a self-timer, some cameras feature a remote control to activate the camera’s shutter – which is great for getting photographers into the picture as well as in instances where camera shake must be avoided. Moreover, this camera also allows adjustments to the level of zoom by using the remote control unit.

Mode Dial
The main operating modes of this camera may be selected using this dial. Whether, for instance, shooting moving pictures, capturing images in aperture or shutter priority mode, or for accessing any of the special scene program modes such as Portrait, Night-scene or Sports, the mode dial gives quick and easy access.

Monitor Buttons
A variety of buttons ensure speedy navigation through the camera’s multitude of photographic features. The main group comprises the intuitive arrow-pad which allows access to most functions. However, other buttons may also provide access to commonly used functions such as flash mode selection or for choosing between macro shooting and spot metering.

Monitor
Most cameras include an LCD monitor. Not only does it allow for easy framing of images while showing the exact picture that will be captured in true colour, brightness and focus, photos taken can be instantly checked. For example, on this camera, the photographer need merely hit the “Quick View” button twice, located to the right of the monitor, to view the last picture shot.

USB, Video & AC Ports
The USB port is used to connect the camera to a PC to upload images. Most cameras will also include an AC adaptor to charge the battery or to run the camera from the mains. Most digital cameras allow you to display images and video on a TV screen.

Digital Photography Made Easy
Buying a Digital Camera

Digital Zoom or Optical Zoom, What’s the Difference?

As is the case in traditional photography, the lens is one of the most important elements. All you need to do is get as close to your subject as possible to get a good quality image. High-quality glass provides better optical quality and, if you want a zoom lens, make sure the figure you look at is the optical zoom, not the digital zoom.

A zoom lens allows you to get really close to your subject. However, some camera makers highlight the digital zoom quality of their cameras because it can achieve impressive figures of 8X, 12X, etc. Unfortunately, what you are really being offered is a cropped version of a shot. This means that the shot you want, you sacrifice precious pixels.

An optical zoom lens is better because it increases image magnification through the lens itself. This means that, if you use the optical zoom to compose your shot and you take the shot with a 4-megapixel camera, you get a 4-megapixel image. The zoom ratio refers to the ability of the lens to move from one focal length to another. The equivalent figure for a 35 mm to 70 mm lens on a camera would be a 2x lens.

You may not think that case design is an important consideration for your digital still camera purchase, but the fact that a camera can comfortably slip into your shirt pocket may determine whether you have a camera with you the next time you would like to take a quick shot.

Large cameras present two potential problems for the user. Firstly, the size may mean that you don’t carry the camera with you and secondly, an SLR type camera with a huge lens may make you, or your subject, too self-conscious of the camera to provide you with the most natural shot.

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Digital still cameras perform best outside with reasonable sunlight and not too much contrast. Flash lighting can often pose a problem for digital still cameras, as an unorthodox lighting. If you need control over your shot, go with a camera that offers some exposure options such as shutter priority, aperture priority or full exposure control. Even the most sophisticated pro digital cameras offer a “full auto” mode, in which the camera makes all of the exposure decisions, and the photographer just pushes the shutter button. If you leave the camera in its auto capture mode, you’ll never have to deal with the complex list of features, modes, and functions that many cameras offer as shooting options.

If you really do want to snap the shutter in auto mode, view the pictures in playback mode, and get the pictures into your computer.

Compression Options

When deciding on your next digital still camera look at the compression options available and make sure yours has an uncompressed or RAW setting for the best quality possible from an image.

If you don’t have RAW or TIFF setting and you intend to print your digital photos at the best quality, set your camera at the highest quality level of JPEG (Q5) compression.

While the mid- and low-quality settings allow you to fit more images on the camera’s memory card, there is a big trade-off in image quality. The highest-quality level of JPEG compression will deliver excellent image quality. Some cameras offer the ability to record images as TIFF files, however, these are much bigger files and offer minimal visual improvement in the final stage.

Stick to camera’s optical zoom and avoid using the digital zoom. Digital zoom actually works by zooming in and enlarging the pixels on the camera’s imaging sensor.

The process of digitally increasing the magnification involves discarding digital information, resulting in an overall loss of image quality. If you want to increase your camera’s optical zoom range add a telephoto lens adapter that screws onto the primary lens.

Exposure Settings

Check the camera’s shutter speed, particularly when shooting under low light conditions without a flash. It’s easy to concentrate on the image on the camera’s LCD screen while your camera is selecting the shutter speed of 1/2 to 1/30 sec. Don’t rely completely on the camera’s LCD to compose an important shot. Many digital photographers use the optical viewfinder, rather than the LCD, to conserve battery power, not realizing that the viewfinder may only provide as little as 80 percent of the actual captured image. If framing is critical to the look of the picture you will have to use the camera’s LCD for full-frame composition.

Battery Choices

Battery power, or the lack of it, is one of the major complaints from digital camera users. Turn off the camera between shots if you’re not indoors a camera can comfortably slip into your shirt pocket or bag. If you can move quickly from one card to another without having to decide on which images to delete.

The price of digital camera memory has fallen dramatically in the past 12 months making it relatively affordable. Extra storage is critical, especially if there is nowhere to download your prints for storage whilst travelling.

White Balance Control

One digital camera function that you learn to set manually is White Balance. Depending on the light source in your picture, the light can produce distinct colour cast. Light sources such as sunlight, tungsten bulbs and fluorescent lights produce a cast in your picture. Though the camera’s white balance is often successful in producing an image with balanced colour, manually setting white balance can deliver cleaner and more accurate results, especially when you’re shooting in misted lighting conditions.

For example, accurate, full colour sunsets are best achieved by setting the camera’s white balance to Daylight mode.

LCD Screen Advantages

One of the advantages of digital photography is that you can review your image immediately after it has been taken. So don’t just take a single picture. Take two or three. Unlike film, it won’t cost anything to take numerous frames of a subject as you try to create a successful image.

Camera Accessories

While it can be cumbersome and seem too antiquated to use with the latest digital technology, a tripod can make the difference between a blurred image and a crisp professional-looking photograph. Without manual control of shutter speed, many cameras blow the shutter speed so they end up capturing a blurry image. If you can adjust your ISO (film speed equivalent) push it up a stop or two – to 200 or 400 ASA.

Combine a tripod with a remote or a self-timer for the best results. There is another way to increase clarity slightly in your digital darkroom using your Intel® Pentium® 4 processor-based PC and image editing software. Simply apply unsharp mask or sharpen filter to the image before printing or viewing.

Flash Options

“Available light” photography is undoubtedly the best to aim for. Try to avoid the on-camera flash whenever possible. Use it only when you are shooting in bright conditions and need to use fill flash to balance-out strong backlight, unless it is so dark that you need your on-camera flash to capture a picture at all.

Hints & Tips

Always sharpen an image before printing. The unsharp Mask or other sharpening filter in your image processing program enhances the edges in your print. Be careful though, as it’s easy to over-sharpen a photo. Before saving the changes, zoom in and make sure there isn’t any pixelation.

Features available to the digital still camera buyer range from professional Camedia E-20P of Olympus* (left) to the point and shoot simplicity of the Sony* Cyber-shot (right). Professional features include large optical zoom, extensive user control and high resolution, while the entry level models focus on ease of use.

Digital Photography Made Easy

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Digital Photo Printing

The Inkjet Printer Revolution

Every digital camera owner should have a photo printing solution as part of their digital darkroom. This could be a good colour printer through to an online photo-printing service.

Within the last few months, Epson and other manufacturers have released colour inkjet printers that deliver true photo quality results. Printers at a wide range of price points have flooded the market, making their superior resolution, lower cost, and lasting inks available to almost everyone.

Digital photos can be among the most vibrant and beautiful photos you’ve ever taken. If you haven’t seen photographic prints on the latest generation of colour inkjet photo printers yet, you’re in for a pleasant surprise.

From Camera to Print

There are a variety of ways to move photos from your digital camera to a PC to prepare them for print. The most obvious is to load the software drivers that came with your camera, connect the USB cable and upload the images.

Another way to move the images is via a card reader. This holds the memory card, and the PC sees it as an external hard drive. Card readers are a very practical way of transferring images. Firstly the camera doesn’t have to be on while the transfer takes place. Secondly, the camera can be used while the files are being uploaded to the PC. If you have several large memory cards then this can save a great deal of time.

Which Inkjet to Choose

An inkjet printer creates an image by spraying a combination of four to six coloured inks on to paper. Liquid ink, stored in a reservoir, is channelled through tiny jets in a movable print head and sprayed on to the paper. With Epson* you can add more than 6 inks. For example light black is also included with the Stylus Photo 2100, for black and white images with a lot of gradient.

The picture is composed of millions of tiny ink dots of varying sizes and distances from each other. The ink is distributed in a dot pattern called “dithering” which creates the illusion of different colour combinations. The ink dots are merged by the human eye to create the impression of photographic colour and shapes.

Of course, not all colour ink jet printers are created equal. Some are made to handle printing text and graphics as well as photos. Obviously, what you gain in versatility you lose in photo performance.

If you are primarily concerned with image quality then you need to focus on a Photo Quality or Photo Realistic ink jet printer. These usually use six colour ink tanks to create accurate colour rendition of difficult skin tones and photographic colours.

A step up again is the professional ink jet printer. These printers are aimed at professional photographers and for graphic artwork. The printer is capable of printing at extremely high resolutions above 2,880 dpi, making it’s equivalent output to a photographic print. The new Epson* photo inks offer resolutions up to 5,760 dpi.

The quality of the output print on any ink jet printer depends on a combination of factors such as the printer’s settings and resolution, the performance of the inks, the paper and the manipulation of the picture prior to printing from your image editing software.

The biggest factor in determining which photo printer to buy is your own personal taste. The prints from various manufacturers do look subtly different, and the best way to assess this is to get your hands on some sample prints.

If you love creating photo prints, and lots of them, then look for a printer that’s made especially for printing photographs. A photo printer is optimised for this purpose – the prints are of better quality and it’s much easier to produce them.

No matter how much you pay, the latest generation of digital printers provides a wide range of smoother, more realistic colours for beautiful, true-to-life images.

Inkjet Printer Features

- **Colour Ink Cartridges**
  When buying ink cartridges, you need to factor in several elements such as the number of inks, an ink cartridge will produce, whether individual colour cartridges can be replaced, the cost of replacement cartridges and the expected maintenance cycles for the printer before purchase.

  Cheaper printers use colour ink cartridges that contain three or more colours in a single cartridge. When one of the three colours runs out you have to replace the whole cartridge.

  More expensive printers use separate cartridges for each colour, so when one colour runs out it’s a simple matter of replacing the empty cartridge without throwing out any ink.

- **Dithering**
  Dithering is a common function in all inkjet printers. As each printer only has 3, or in some cases 6 colour inks, to re-create the vast range of colour we see around us, the printer needs to place very small dots of different colours together to create more shades. Yellow and blue dots together would make green for instance.

  Dithering is just the graininess caused by using this technique. The smaller the dots of ink are, the less noticeable dithering is.

- **Speed**
  Photo printers have speeds similar to other inkjet printers. They can print up to 12 pages per minute (ppm) in black and white, and up to 10 ppm in colour. For everyday printing, keep in mind that, since they are optimised for photos, photo printers sometimes tend to be sluggish with test compared with conventional inks.

  The new range of Epson photo printers are also fast and high quality for “normal” documents and only use the black ink, so quality on text is not reduced.

  As anyone who works with digital images on the PC will tell you, one of the most important aspects of hard copy output is the paper. Similar to the paper used by photo labs, paper photo is specifically designed to produce high quality colour-rich images that are hard to distinguish from traditionally developed photographs.

  Most photo papers come in a choice of matte or glossy finishes and in a variety of print sizes, including convenient 15 x 10 cm for affordable everyday prints, and large portrait size papers for studio-quality enlargements.

- **Glossy Paper**
  Glossy paper produces vibrant colours but is susceptible to fingerprints. This paper has a shiny, coated surface on one or both sides, and is ideal when you need a polished printout. For brochures, flyers, report covers and special presentations, glossy papers produce colourful images and crisp text equal to professional printing.

- **Transparencies**
  These clear sheets of plastic are used with overhead projectors for presentations.

- **Stickers and Labels**
  Stickers and labels are available for mail, folders, diskettes, CDs and anything else you can think of. You can use fonts, images and colours to customise them. Removable stickers provide more creative flexibility. With some of the new Epson printers you can actually print photo’s directly onto CD faces.

- **Craft Papers**
  Specialty papers offer a wide range of possibilities to the crafts person. Iron-on transfers make it easy to create your own T-Shirts, photo pillows and much more. Or you can also get your message out loud and clear with banner paper.

Other craft papers specifically formulated for printers, such as vellum and parchment, printable sheets of fabric like felt and canvas, printable Mylar, shrink-wrap plastic, and window clings, make the world of printing practically limitless.

With Epson photo printers you can also print on rolls edge to edge and some photo printers have built-in cutters, so you can print all of your photos just like you get from a photo lab.

Web/Retail Printing Services

Many of the well known developers/retailers allow you to upload digital images from your PC to their Web sites. Alternately you can bring your digital storage media to the retailer to get this process. Here you can select the print size you want, pay and opt to pick your prints up from your local processing lab, retailer or have them mailed to you.

These services make digital photo printing easier than it has ever been.

Another option is to create an online album, upload your images and e-mail the Web address and password to friends and family. They can order the prints and either pick them up or have them mailed from their local lab.

Digital photo files that you or your photo lab upload are stored in a high resolution format to ensure your photos are as clear as possible.

Hints & Tips

A general rule in digital photography is that you will run out of printer ink cartridges for your printer at the most inconvenient time. Always keep at least one spare set of cartridges on hand to avoid frustration.

Crucial to quality prints, you need to start with the appropriate ink and paper. For photo printers, can output high quality on plain paper, however, for the best results you need to print on photo-quality inkjet paper. Paper choices range from matte to full gloss.
Dye-Sublimation Printers

While ink jet printers currently dominate the photo printing marketplace, Dye-sublimation (Dye-sub) printers are an interesting specialist printer used for a variety of purposes.

Dye-sublimation printers have been widely used in demanding graphic arts and photographic applications. A true dye-sub printer works by heating the ink so that it turns to a solid into a gas. The heating element can be set to different temperatures, thus controlling the amount of ink laid down in one spot. The difference between a dye-sub and an ink jet printer is that colour is applied as a continuous tone, rather than in dots.

One colour is laid over the whole of one sheet of paper at a time, starting with yellow and ending with cyan as a colour. The ink is impregnated on rolls of cellophane-like film that contains sheets of every CMYK colour, so for an A4 print there is an A4 size sheet of yellow, followed by a sheet of magenta and cyan film. In good dye-sub printers generally deliver better quality than ink jet printers because they are not printing an image using dots of ink. The advantage is that a dye-sub printer allows for the reproduction of subtle tone and continuous tone images. Also colours are printed on top of each other (ink jets only print one colour at one place).

Because of the film and the special paper required, dye-sub print systems are usually more expensive to buy and maintain than ink jet printers. However, because they have less moving parts than ink jet printers, dye-sub printers can be a fraction of the size.

Meet The Pixel

One concept to keep in mind is that a digital image really has no size but rather a volume that occupies space on the hard drive. At this point, the file has no real physical size. It only fills a certain volume of storage space. Obviously at some point this image needs to be viewed or printed using the pixels that make up the length and width of the file.

If you enlarge a digital photo via some image editing software you soon realise that a digital image is nothing more than a mosaic of pixels that run the length and width of a file. If you are comfortable with the concept that a digital pic is really nothing more than lots of dots, you will soon be on the road to understanding resolution.

Figure 1 shows an enlarged view of a file from a digital capture at 15x magnification. You can easily see the individual that make up the image as seen in normal view in Figure 2. The file seen here is a 2,560 x 1,920 pixel image. The width is 2,560 and the height is 1,920- all pixels. This is really the only information needed to define the resolution.

Figure 2

Common units of measure are the inch or the centimetre or PPC.

In imaging PPI is the method most often used when describing the resolution of a digital file. However, it’s also common for people to use the term DPI or Dots Per Inch. Semantically this is incorrect. Dots Per Inch is a method of describing output resolution because printers and monitors create dots. Digital cameras and scanners create pixels.

What is important to understand is that a pixel becomes a dot when it’s output. For example, let’s say we have a printer that is capable of laying down 300 dpi, and we send that printer a picture that has 300 pixels from end to end. The resulting print will be one inch in size because for every pixel one dot will be created. Therefore, each dot is 1/300" of an inch and you get an image from the printer that is one inch in size.
Image Editing Software

Choosing an image-editing package depends on the way you work and where you want your work to be displayed. Experience also has a part to play in the application you choose. It is pointless paying lots of money for an application that is beyond your capabilities. Likewise, an application that does not provide the control you require can also be frustrating.

What Image Editors Do

Image editors allow you to create and modify bitmap-based graphics and photographic images. Tasks include painting and drawing, colour correction, photo enhancement, creating special effects, image conversion, and sometimes adding text to graphics.

Image editors offer tools to satisfy a large range of image editing users and as such the choices available are wide and varied. Professional photographers, graphic designers, desktop publishers, Web developers, digital artists and home users all need to work with an image editor at some point.

When choosing a photo editor for professional or business use, you need extreme flexibility, stability, and an intuitive interface which provides high-end features and a streamlined workflow. Automation capabilities are also a big feature.

A professional application such as Adobe Photoshop 7 offers powerful features to help graphics professionals work faster and more effectively.

For Photo enthusiasts who don’t require all the power of the professional Photoshop software, but want more control and flexibility than the entry level products offer, Photoshop Elements 2.0 is the perfect choice. Providing the perfect balance of power and simplicity, you can do everything from basic tasks as rotate, crop and remove red-eye to more advanced editing as color correction and retouching.

Entry level photo editors need to draw the user into the creative process with wizards and templates, which encourage the user to experiment with images. Applications such as Microsoft Picture It! help the new user to create great images without too much hassle.

Presets or templates help you achieve polished results right away. Unfortunately, this can lead to frustration at the simplicity of the program as you become more adept at working with images.

Another enhancement to the interface is the new Tool Presets palette. This allows you to create custom tool settings and save them in the one palette. It even works with the tool set, so you can set font face, size and paragraph formatting such as leading and kerning, and instantly recall them in other documents.

Photoshop 7 is full of small additions, which add up to a far more usable and powerful package. The first change you are likely to notice is the addition of a new palette, the file browser. This allows you to browse your system or network for images in a Windows Explorer style interface. Directory structure is represented in the window, there is an information panel below it and, on the right, is the image preview/edit window.

The browser caches the images, so once you have visited a directory the thumbnails are generated quickly. If your image comes from a digital camera that supports Exchangeable Image File (EXIF) information it will be displayed when opened in Photoshop 7.

Applications such as Microsoft Picture It! help the new user to create great images without too much hassle.

Presets or templates help you achieve polished results right away. Unfortunately, this can lead to frustration at the simplicity of the program as you become more adept at working with images.

Adobe Photoshop 7.0

Photoshop is the undisputed market leader in bitmap editing packages, and with very good reason. Each full release has wowed the design community with its groundbreaking innovations - from the layers introduced in Photoshop 3 through to vector shapes and layer effects in Photoshop 6 - making upgrades a must.

Photoshop 7 continues the trend, offering improvements and new features to help professionals get the job done.

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Adobe Photoshop Elements 2.0

Adobe Photoshop Elements 2.0 is an affordable, easy-to-use digital imaging program, designed for amateur photographers and photo hobbyists who want to do more with their images for print, e-mail and the Web. Powerful, yet easy to use tools and features allow users to touch up and enhance photos from digital cameras or scanners; create original images with the new paintbrushes, textures and special effects; merge photos into panoramas; easily capture individual frames from video clips; and do a wide range of other image editing tasks.

An easy to understand, accessible interface makes it simple for users to take advantage of Photoshop Elements remarkable imaging power. Start imaging right away with the Welcome Screen or go right to the enhanced File Browser to quickly preview, open, and organise photos, and view important metadata about each photo, without opening the file.

And Photoshop Elements provides the Web Features users really need. It takes the hassle out of sharing pictures, but always gives the user the final say in how the picture will look and be packaged. Easily attach edited photos to e-mail using an existing e-mail program. Photoshop Elements can automatically resize and optimise the file for sending and viewing. The Save for Web dialog provides users with visual feedback on different optimisation settings, so images look sharp on the Web and download quickly. Easily assemble a Web Photo Gallery that can be shared or posted on the Web. Create an Adobe Portable Document Format (PDF) Slideshow, complete with transitions to share with friends, family and associates. Anyone can view the PDF, even on Palm and Pocket PC Devices. Or directly upload photos to various online services for prints, greeting cards, border effects, and sending to friends and family.

Microsoft Picture It!

Microsoft Picture It! puts you in control of your photos through a unique combination of powerful digital imaging tools with helpful wizards and professional-quality photo projects. Picture It! offers advanced tools that let you create your digital pictures look the way you want them to.

Choose from over 3,000 professional photo projects or a wide variety of special effects to enhance your photos for sharing through prints, e-mail, and the Web.

Benefits include:

- It's easy to get started and used. You can use photos from just about anywhere—a digital camera, a picture CD, scanner, hard drive, or the Web. With the new file browser, additional file menus, and the new startup window, it will take even less time to correct all of your photos.

- You can fix, organise, and print photos fast. The Mini Lab and Gallery tools make it quick and easy to bring in a several pictures at a time, make them perfect, and organise them so they are easy to find and use.

- Photo templates and projects help you create like a Professional. Picture It! Digital Image Pro includes 3,000 pre-created templates for letterheads, business cards, presentations, photo albums, photo cards, frames, calendars, magazine covers, web photo albums, and more. You just supply the picture and make professional-quality results.
Editing Photos On Your PC

Take an Intel® Pentium® 4 processor-based PC, add the right image editing software program for you, connect a digital camera and you have an effective and highly creative digital darkroom on your desktop.

One of the most exciting aspects of digital imaging is that, thanks to the power of the latest Intel Pentium 4 processor-based PCs, photographers now have more control of their creative destiny than ever before.

Digital photography today is sophisticated and affordable for the home user. With any one of the myriad image editing programs currently available, it's easy to make dramatic adjustments to your photographs.

With an image editing program, digital photographers can, after a little guidance, touchup, repair and enhance most common photo problems.

Some are basic programs that allow you to crop a photo and change brightness, contrast and colour balance. More sophisticated programs – like Adobe® Photoshop™ – let you edit every pixel. However, many casual users find themselves way over their heads with some of the top-end professional graphics programs currently available.

There are less expensive programs for photo enthusiasts. With some applications, editing is just the beginning. If you’re interested in artistic photo projects – albums, collages, calendars, announcements – check out Microsoft*’s Picture It!* and similar programs.

Step 1: Cropping

Most photographers generally try to frame or crop their shots to include the necessary elements in-camera. However, sometimes you may find it necessary to crop the picture in the editing process. If you are cropping, it is important to keep in mind the main ‘focus’ of the photo.

If the picture you have in your viewfinder is going to be a landscape, you may not want to crop it at all. For instance, if you have a farmhouse sitting in the middle of the wilderness and you crop all the surrounding bush away, you may lose the effect of the lone building in the vastness of the landscape.

All image editing software will include a cropping tool. Some programs allow the cropped area to be finely adjusted by dragging the corners of the cropping rectangle that appears over the picture. Experiment with cropping the image in various ways (saving separate files each time you complete a crop), until you find something that looks just right. If you have an image browser program you can compare image thumbnails side-by-side to see which one looks the best.

Step 2: Sharpen Your Image

Those new to digital photography often think you can focus an out-of-focus image with image editing software. You can’t. But you can sharpen the photo.

Devices such as photo scanners and digital cameras can cause some loss in the resolution of the image they capture. The software’s Sharpening Filter can correct this. The way the filter works is to alter the pixels at the edges of objects in the image by lightening the lighter pixels and darkening the darker pixels – creating an illusion of contrast – and therefore a sharper image.

Step 3: Lose The Red-Eye

Red-eye is becoming less of a problem. If your camera is equipped with red-eye reduction, use it to eliminate that annoying red glare that results when the light from the flash is reflected by the retina of your subject’s eyes. If your camera doesn’t have this feature, don’t despair – most image-editing features have incorporated red-eye correction in their programs.

In most cases there is a dedicated Red-eye Reduction tool that you can use to either automatically or manually eliminate the alien eyes from your flash photographs.

Step 4: Blur To Achieve Clarity

That’s right, you really can give the photo more clarity through blur! This technique can be fun – a cool alternative to cropping. Eliminate distracting clutter by feathering or motion-blurring the area around your subject. For example, do you have a photo of your child at a birthday party? Of course other babies in the picture aren’t as adorable as yours – so blur them out, so they are out of focus. It’s a great way to add interest and draw the viewer’s eye toward the subject of the photograph.

Step 5: Clean-up Dust and Scratches

Dust and scratches on a photo can ruin an otherwise perfect picture. Luckily, they are easy to repair with all image-processing software.

The imperfections can be a result of grime on the camera’s lens, or more commonly, a problem associated with scanned images.

Using the Dust & Scratches, or Despeckle tool is so simple to do that you’ll want to get out all those boxes of old photos, scan them into your PC, clean them up digitally and proudly display them as new again.

If you have the patience, the Cloning Tool is a great way to eliminate elements in the picture you want to remove manually.

Step 6: Adjusting The Colour

Changing the colour in your picture is completely up to you. You can even convert a colour image to black-and-white and then rein-colour it with your own choices. However, you must calibrate your computer’s screen and the ink jet printer.

Hints & Tips

Before starting to edit your picture it’s a good policy to retain the original by saving the image as another file before you apply any effects. For example, a file called Effitower.jpg, could be saved as Effitower01.jpg. That way, the original is not touched so if you don’t like the results, you can go back to the original file and start again. Remember, you don’t necessarily need to manipulate the digital images you have taken. The software adjustment suggestions above should be applied only if you feel the picture would benefit from manipulation. You can make a few minor adjustments and the few minutes that it takes will make a definite improvement to your printed output.

Even though most photographers capture colour images with their digital, it is important to ensure the image is well adjusted for black and white. When viewing a picture your eye is generally attracted to the lightest part of the photograph first, so make sure that something that’s supposed to be white is actually white, rather than a dull grey. When correcting the photo’s elements in image editing software, evaluate the image not only for colour and sharpness, but also for rich blacks and whites that will deliver a strong, well-contrasted picture when printed.

Hints & Tips

One of the advantages of digital photography is that you can review your images immediately after they are taken. So don’t just take a single picture. Vary the focal length, perspective, framing and overall composition. Unlike film, it won’t cost anything to take numerous frames of a subject as you try to create a successful image.

Digital Photography Made Easy
**Image Browser Software**

Image browsers are handy programs that help you view, organise and file digital photos in different ways. An image browser not only helps you organise images, but lets you view actual photos, rather than just file names. This makes looking for a specific image in your large library of photos much simpler. It’s like keeping photos in a photo album rather than a box in the back of the cupboard.

Most digital cameras include a basic image browser with the included software bundle. This software will generally allow images to be viewed either while they are still in the camera or once they have been uploaded to the PC.

Some browsers also include basic image editing software. The browsers can generally be bought off the shelf and virtually all can be purchased and downloaded from the Internet.

**Windows XP** includes an Image Browser

The My Pictures folder in Windows XP* has special features that enable you to view pictures as photos, not just as document icons. My Pictures’ image browsing features includes the ability to view thumbnail-size and large versions of your photos, rotate photos and create a slide show. You can also view a photo’s details, such as its dimensions, the date and time it was taken, and the name of the camera that took it.

Windows XP* provides a great basic browser for viewing and organizing images. But if you are planning on taking more than just personal photos, consider purchasing a dedicated image browsing program.

In addition to basic photo viewing features, browsers offer different ways to work more efficiently. For instance, some have the ability to apply changes to groups of photos (known as batch processing). Common batch processing tasks include renaming files, converting photos from one file format to another, and rotating. Often a single click of the mouse begins the batch processing of a selection of photos, or even an entire folder of photos.

Whether you use the built-in browser in Windows XP, one included with your digital camera, or a program of your own choosing, if you start off organised you’ll stay organised as you shoot more and more photos.

**Panorama Software**

In the past, creating a decent panorama from multiple photos was a tough task. You needed special cameras, or at least a regular digital camera and plenty of patience. The software required to stitch your still photos together into the panorama was usually unwieldy and difficult to use, resulting in both frustration for the user and a shabby end result.

That’s all changed with the latest generation of panorama software to hit the market. Today there are several programs that are very near idiot-proof for creating basic panoramas.

The interfaces for all the programs are simple and user friendly. Even though creating a panorama is reasonably complicated stuff, you never really feel overwhelmed thanks to the helpful wizards accompanying the programs. Most utilise a basic three or four step workflow that logically guides you from start to finish.

The most important part of creating a panorama is taking the pictures with your digital camera.

Once the images are in the PC you begin by selecting the pictures you’ll use in the panorama. Most software allows for visual previews and thumbnails of potential images so that when you’re choosing the files you want, you’re looking at the actual picture.

Once the images are in the program, they need to be moved in order to achieve the perfect panorama. The program will perform automated photo warping, blending and overlap in order to combine the separate pictures into what appears to be one continuous image.

You can also use colour adjustment and balance tools to correct differences between the pictures. While you’re working with the images you can do a quick panorama preview to see check your progress.

When you’re happy with the results, there are a number of choices for the finished product. You can save the panorama as a MOV, BMP, JPEG, PNG or TIF file; print it, copy it into other programs, or post it on your Web page.

For the latter, most software can help by automatically generating the HTML code you’ll need to let people view your panoramas online. You can also e-mail the finished panorama file.

Seamless panoramas are made as follows:

- **Use the same exposure for each picture (set the camera to the best guess of average illumination over the scene).** This is important because stitching programs sometimes have trouble blending colours (especially sky areas) if they do not have the same exposure, and it’s hard to fix this in an image editor.
- **Overlap the pictures by about 20% for normal focal lengths (50 mm and up).** The wider the lens you use, the more you should overlap - up to 40% or 50% for a 20 mm lens.
- **Hold the camera level.** Tipping it up or down will cause the final combined result to be curved upwards or downwards. Generally you want level and horizontal images. A tripod is the best for achieving this, especially if it has a usable bubble level.
- **The pictures can be portrait or landscape orientation.**
- **Take the pictures from left to right across the scene.**
Photographic Techniques

Before moving pictures to your PC’s digital darkroom for processing, there is a great deal you can do with your digital camera to ensure you capture the best photos possible.

Holding The Camera

Believe it or not, good digital photos can start with something as simple as holding the camera correctly. Using both hands is the best start. Some digital cameras are tiny and have many buttons, dials and menus, so make sure you are holding the camera correctly and there are no stray fingers covering the lens or flash. With all digital compact cameras you can use either the eyepiece view finder or the LCD screen to compose a shot. However, what you see through the eyepiece view finder is not exactly what you see through the lens. It’s not on the same focal plane and you can only see about 90% of what the camera sees. For critical framing use the LCD screen. Keeping the camera steady is also important for good picture taking. Holding the camera with both hands will help stop camera shake, and tucking your elbows into your body will prevent the camera from swaying.

The “Move In Closer” Rule

One of the advantages of digital photography is that you can evaluate your photograph immediately after it has been snapped. You can also shoot several pictures, erasing the ones you don’t want. However, one technique to try is the “Move In Closer” rule. Each time you snap a shot try moving in closer, changing the framing, to snap a second shot. Close framing will often provide you with a better shot. Having your subject almost fill the frame helps your viewer understand and appreciate the photograph more, and having detail in a shot is often more interesting than an overall view.

The Rule of Thirds

While there are no hard and fast rules in photography, one technique that can help with composition is the “Rule of Thirds.” You can use the rule of thirds as a guide for the off-centre placement of the subjects in your photographs. Here is how it works:

• Before you press the shutter, imagine your picture area divided into thirds both horizontally and vertically.
• The intersections of these imaginary lines suggest four options for placing the centre of interest to achieve good composition. The option you select depends upon the subject and how you would like that subject to be presented.

You will find that when you apply the rule of thirds to a scene when framing your photograph, it will produce a visually pleasing picture. People “read” a picture from left to right. Even though it is fine to place your subject in the middle of the frame, it is actually more pleasing compositionally to place the focal point in the top-right, top-left, bottom-right or bottom-left area of the frame, away from the edges at the intersection of the thirds. You want to avoid the bullseye effect that you sometimes get when you place the subject dead centre.

Compose Your Photograph

There is a big difference between taking a photograph and clicking a snapshot. Photographs generally happen when the photographer takes the time to compose his or her shot. A visually balanced picture with interesting elements that capture the eye and lead you through the picture help to make the difference.

Tips for good composition include:

• Keep the horizon level.
• Move in closer or zoom to crop out elements that you are not interested in, or which distract from the subject of the photograph.
• consciously place the subject in the appropriate part of the photo rather than just accepting wherever it happens to land in the photograph.
• Think about the perspective elements in the shot. Check that all the lines in the picture show a pattern or lead the eye to the main subject of the photograph.
• Think about the “negative” space in your picture, that is, the area around your focal point. How does it complement your focal area? If the negative space is more vertical than it is horizontal, you may want to turn your camera sideways to capture more of the surroundings (your image area is rectangular, and the long side is usually the horizontal axis or “landscape” orientation).

Exposure Controls

Exposure – the amount of light you let through the camera’s lens – is one of the most important aspects of digital photography. As you become more serious about digital photography you’ll find more ways to control exposure. Virtually all midrange digital cameras will offer aperture-priority and shutter-priority functions as standard.

These controls ensure correct exposure, the shutter speed and the aperture (or iris opening) of the lens.

In simple terms, the shutter controls the length of time that light strikes the camera’s sensor. The aperture controls the amount of light that passes through the lens at any given time.

Until about 30 years ago, most cameras required the user to set the lens opening and the shutter speed manually. As camera technology developed it allowed the user to set one of the two while the camera would set the other automatically. These are known as Aperture-Priority and Shutter-Priority.

With aperture-priority, the size of the lens opening is set while the camera automatically selects the appropriate shutter speed for good exposure. As you might have guessed the aperture enlarges or reduces the lens aperture, changing the amount of light entering the camera. Now, as you might have guessed the way you set the aperture or the shutter speed will dramatically influence the way the picture looks. And since you are now shooting digital, you’ll be able to experiment with both forms of automation and see what works best for you right away.

Use Light to Create Interest

Some people call photography “painting with light.” In effect, that is exactly what you are doing. The light in your scene is really the paint that ends up on the canvas of your photograph. Take a good look at the scene you are photographing to see what kind of light you are working with. Which way are the shadows falling? Unless you want a silhouette effect, with your subject back against the background, it’s generally best to shoot with the sun behind you.

Early morning and late afternoon sunlight offers some of the best lighting for photography and overcast days provide the best natural lighting for portraiture. When the sunlight is diffused, it softens the features of your subject. In bright sunlight, people tend to squint and blink more often, and high contrasts can bleach out or darken important features.

Avoid shooting directly toward the sunlight or you may get a white background with little detail. Experiment with artificial lighting, there are many different effects you can achieve. The great advantage of digital cameras is that you never have to worry about wasting film as you experiment with different light sources. You can delete shots that don’t work at any time.

Tip: Your exposure settings determine the importance of an object in your image. Here the shutter speed has been extended to give the impression of movement in the scene. Controlling exposure can make the difference between a snapshot and a creative photograph.

Try to compose your shot to achieve a visually balanced picture with interesting elements that capture the eye, leading you through the image. In this picture your eye is led by the light coloured pavers leading towards the church.

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Sharing Your Digital Photos

One of the key benefits of digital photography is that it lets us share and organise the images and memories of our lives in ways that are impossible with conventional film. A PC and imaging software allow for the creation of digital darkroom media such as floppy discs, CDs and DVDs so that images can be easily distributed. With the advent of the Internet, the ability to globally distribute images from a PC has become a reality. So, let’s look at some of the best ways to enjoy your new ‘digital freedom’ and the distribution options you might consider.

CD-ROM, VCD and DVD

Regardless of the type of system you use, it’s important to backup digital photos to CD-ROM on a regular basis. It would be tragic to lose memories forever because of a hard disk crash. Windows XP includes CD-burning capabilities and you can purchase loads of third-party tools for burning CDs.

Many digital camera users also want to display or distribute their images in a slideshow format so they can be watched on a PC or even on a TV. There are several software packages that allow the images to be saved as a slideshow – with music, transitions and titles – on to a CD or DVD.

One of the many benefits of digital photography is the choice of display methods. Traditionally, people view their photos on computers, or print them via their ink jet printers. A limited number of people might use a digital projector and display their photos at a very large size.

If you don’t print them out how do you show a friend or client? With the increasing use of DVD players and the correct software-package you can now write your photos to a DVD or CD which will play in many home DVD players.

The Web

Because of the constraints imposed by monitor resolution and Internet bandwidth, photos destined to be posted “as-is” hardly ever require high resolution. But, if the photos are going to be altered or manipulated in a photo editing program, then a higher resolution might be necessary to start with even though the images may end up smaller when in place on the Web.

Most major online services offer digital image printing processing and other Web services provide places to post images. Once you have placed your images on these sites you can send a URL (web address) to friends, family or business contacts along with an access password and they can view them.

If your are posting your images on your own Web site, remember the Golden Rule - limit image size.

Most Web photos are stored as JPEG files. Photos that come from a Megapixel digital camera are JPEG files but they are quite large – far larger than is suitable for Web viewing. They will need to be resized to a smaller file size in an image editing program.

Traditional graphics file formats such as BMP (BMP), TIFF (TIFF) and Photoshop (PSD) are not practical for use in Web pages. The files are far too large and their support from the major Web browsers is limited (as with BMP files) or not available at all (as with PSD files).

Of the three most common web graphics file formats – JPEG, GIF and PNG – JPEG is the most suited to photos. JPEG offers the best compression method and can display images in True Color.

One of the reasons why JPEGs are so practical for image files is due to their extensive set of compression options. JPEG quality options are based on a scale from 1 to 100, where 1 is the poorest and 100 is the best quality.

There is no perfect quality setting for all pictures, which is why most systems offer a preview of the image. However, as a general rule of thumb, 70 to 80 is a good starting point. For the vast majority of images somewhere between 60 and 90 will work; below 60 the image quality falls below an acceptable level and, above 90, there is little noticeable improvement in file size reduction.

By matching image quality with file size you should try to range your images between 40 KB and 100 KB for optimal Web performance.

Many image editing and image browser programs allow you to automate the process of making the image Web-ready. Most imaging software includes the ability to Batch Resizes, or Format images for the Web. This allows you to apply the Batch tool to folders of photos, resize, rename, and convert them – on the fly – if needed.
A Basic Digital Photography Glossary

Words to know and understand as you explore the convergence of photography and computers.

Archival Storage:
Using external media such as disks and CDs to store information long-term.

Bit Depth:
A digital image is represented as a Bitmap (a grid of dots). The bit depth is the number of tones that can be associated with each dot. 1-bit contains 2 colours – black and white. 8-bit colour contains 256 shades (colour or gray), while 24-bit colour contains 16.7 million shades.

CD-ROM:
A compact disc containing information that can only be read, not updated or recorded over.

CMYK (cyan, magenta, yellow, black):
Used in four-colour professional printing, such as magazines. CMYK images will reproduce the most photo-like look in the printing process.

CPU (central processing unit):
The “brain” of a computer system. It consists of the main chip such as the Intel Pentium IV processor, and the necessary circuitry to transport information to and from it.

Dot Pitch:
Typically used to evaluate a monitor’s sharpness as a measurement of the distance between dots. A smaller number indicates a sharper monitor.

DPI (dots per inch):
A measurement of print resolution. DPI indicates how many individual dots a device can create on a page per square inch of area. The higher the dpi, the better the resolution. A screen image usually appears at 72 dpi, whereas an inkjet printer usually prints at least 300 dpi. DPI is only one factor in image quality.

Driver:
Software that comes with a computer peripheral (i.e., printer, scanner, digital camera...) that allows the peripheral to communicate with the PC.

Dynamic Range:
The difference between the highest and the lowest values, as in the brightest highlights and the darkest shadows in an image.

File Format:
A method for arranging the data that makes up an image for storage on a disk or other media. Some standard image file formats are JPEG, TIFF and GIF.

Gigahertz (GHz):
A measurement of digital data approximately one billion bytes (1,000 megabytes).

Gigahertz:
The speed at which a processor can execute instructions is known as the clock cycle or clock rate. This rate is expressed in gigahertz (GHz) with 1 GHz being equal to 1 billion cycles per second or 1,000 megahertz. The faster the clock, the more instructions the computer can execute per second.

Interpolation:
A method of increasing the apparent resolution of an image by “filling-in” the gaps between existing pixels – virtually increasing the pixels per inch (ppi).

JPG (Joint Photographic Experts Group):
A file format used with photographic and other Bitmaps. The J PEG format “compresses” image information to create smaller files. J PEG files lose image data and, as compression increases, quality.

Lossless Compression:
Any file compression technique where no loss of image data occurs. For example, a TIFF file.

Lossy Compression:
Any file compression technique where some loss of image occurs. For example, a J PEG or GIF file.

Megahertz (MHz):
One MHz represents one million cycles per second. The speed of microprocessors, called the clock speed, is measured in megahertz. For example, a microprocessor that runs at 200 MHz executes 200 million cycles per second.

Pixel:
Short for picture element (or picture, element). The smallest element of a picture that can be controlled by the computer.

PPI (Pixels per inch):
The number of pixels per inch in an image, often used interchangeably with dpi.

RAM (Random Access Memory):
The computer’s memory that is active for use in programs.

Resolution:
The density of pixels in an image or the number of dots per inch a device, such as a scanner, can achieve.

RGB:
The primary colour system of a computer based on red, green and blue, the additive primary colours. Computer monitors display RGB-based screen images.

TIFF (Tagged Image File Format):
An Important Bitmap image format common to most image-processing programs.

USB (Universal Serial Bus):
An input/output (I/O) bus capable of data transfer at 12 megabits per second used for connecting peripherals to a PC.

White Balance:
A metering function based on the colour temperatures of different light sources that digital cameras use to represent colour correctly. Many cameras have automatic white balance, others let photographers adjust it.

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