

Printing 101

Rowena Wolton & Andy Kirby

Marlow Camera Club

12th September 2023

Why Print?

Besides entering print competitions, there are a lot of reasons to print:

You have control over how the image is seen. It doesn't depend on the viewer's screen or projector.

The process of creating a print is as engaging as the processes of taking a photograph, and editing it. You have a greater sense of investment in the end product.

Ansel Adams said that a photographic negative is like a musical score, and the print is like the performance of the piece.

You have control over how the image is presented and the choice of paper, processing and mount can have a big effect on the 'mood' of an image.

Prints are a tangible thing that has a value. It can be looked at again and again. It might make a nice gift. A photo on a computer screen is transient and of no value – one swipe and it's forgotten.

There is much more information in a print:

Portrait within PDI bounds is $742 \times 1050 = 0.8$ Megapixels

PDI maximum size is 1400×1050 pixels = 1.47 Megapixels.

A4 printed at 300dpi is 2480×3507 pixels = 8.7 Megapixels.

A3 printed at 300dpi is 3507×4960 pixels = 17 Megapixels

-> 6x more information in an A4 print than on a PDI

-> 11.5 x more information in an A3 print than on a PDI

Modest Cameras are upwards of 26Megapixels – so we are wasting a lot of information when we enter a PDI.

Photobooks

We are all likely to remember photo albums with lots of 6x4 'EndPrints' stuck in a scrapbook style binder. Now there is a modern equivalent which is much better...

Photobooks are a great way to share images of an event, trip or holiday. Quality can be very high - the RPS have for some time allowed Photobooks as a medium for presenting your work for assessment.

One of the most prevalent – and our favourite vendor for Photo books is Blurb: <http://www.blurb.co.uk/>

Blurb have many different kinds of books and their own software "BookWright" which allows editing the layout of the book. Bookwright integrates with Adobe Lightroom making it even easier.

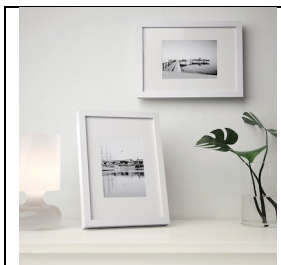
Picture Frames

Picture frames are a great way of displaying our images at home and also make great gifts.

IKEA



- MOSSLANDA picture ledges are useful for displaying prints temporarily.
- Available in a variety of colours, 55cm (£5) or 115cm (£12)



- Ikea picture frames are an inexpensive way to show your prints at home.
- Options start from £1.50 for a YLLEVAD 21x30cm frame.
- RIBBA 30x40cm frame £8 in “oak” finish.
- Also Look for: RIBBA, LOMVIKEN, KNOPPANG, EDSBRUK, HOVSTA, SANNAHED, FISKBO
- Frames can be re-used easily when you get bored of the picture.
- Many Ikea frames come with a pre-cut mount – check the ‘Measurements’ detail to see the cut out size. The size quoted is usually the frame size.
- Some interesting options for triptych.

The Range

533 Inexpensive frames on their website. Website allows searching by photo size.

<https://www.therange.co.uk/picture-frames-and-wall-art/picture-frames/>

Closest stores to Marlow: Slough, Bracknell & Reading

Amazon.co.uk

Amazon have plenty of options for picture frames – and many are available in multiple packs, which are useful if you want to buy a set of 6 the same so they match.

Jumble Sales, Thrift Stores, Charity Shops

Up-cycle old pictures and frames – you don’t have to keep the picture, just use the frame.

Using a Printing Service

On-Line Printing services have come down in price quite a lot in recent times, and many offer expedited next day delivery as well as 3 and or 4-5 day services.

Testing Print Services

We sent the same JPEG files to different inexpensive printing services, selected the default options and the slowest service.

Jessops (Online)	12x8 £1.69ea + £3.99 p&p 4-5 days
Max Spielmann (In Store)	12x8 £8.00ea - 15 mins wait in-store
ASDA (Online)	9x6 £0.50ea + £2.00 p&p 4-5 days (30p via photogiftsnow.com) 12x8 £1.50ea + £2.00 p&p 4-5 days (51p via photogiftsnow.com)
Snapfish (Online)	12x8 £1.69ea + £1.49 p&p 4-5 days
Boots/CeWe (Online)	12x8 £1.99ea + £2.95 p&p 4-5 days
Epson R3000 for comparison	9x6 £1.38ea – instant results

Observations:

- Print services that offered gloss had surfaces that were easily scratched or marked.
- Most print services – even the cheapest - used Fujifilm paper.
- Results are quite subjective. Andy's pick is Snapfish and ASDA/photogiftsnow.com

Common Print dimensions

Most cameras produce files with a 1.5 aspect ratio.

Not all print sizes are a 1:1.5 ratio, so you have to crop your image to fit the paper or add whitespace to make it fit.

Size	Metric Size	Aspect Ratio	Snapfish	ASDA online
8x6"	20.3x15.2 cm	1.33	£0.59	£0.19
8x8"	20.3x20.3 cm	1	£1.30	
9x6"	22.8x15.2 cm	1.5		£0.50
10x8"	25.4x20.3 cm	1.25	£1.25	£0.95
10x10"	25.4x25.4 cm	1		£2.00
12x8"	30.5x20.3 cm	1.5	£1.69	
12x10"	30.5x25.4 cm	1.2		£2.50
12x12"	30.5x30.5 cm	1		£3.50
15x10"	38.1x25.4 cm	1.5	£4.99	
16x12"	40.6x30.5 cm	1.33		£5.00
16.5 x 11.7" (A3)	42.9x29.7 cm	1.41	£6.99	
18x12"	45.7x30.5 cm	1.5	£6.99	£5.50

Most online print services will try to crop the image to fit the paper and don't allow you to add whitespace infill so you don't lose any of your image. To work around this, use the Extend Canvass function in Photoshop (or equivalent) to add whitespace and make the image match the desired aspect ratio.

Printing At Home

Free eBooks from Fotospeed and PermaJet

Some great free resources here. They require you to register with your email address before downloading.

<https://fotospeed.com/ebook/artofprinting>

<https://www.permajet.com/news/the-knowledge-vol-1-the-art-of-paper-selection/>

<https://www.permajet.com/the-knowledge-volume-2-the-step-by-step-guide-to-printing/>

Recommended Reading



Fine Art Ink Jet Printing by Jim Nickelson
(Rocky Nook Publishing)

<https://www.amazon.co.uk/Fine-Art-Inkjet-Printing-Digital/dp/1681982064/>

Why Print at Home?

- In some situations it may be more economical to print at home.
- Instant results you can see, make tweaks and re-print.
- Choice of many papers.
- Flexibility with sizes.
- Finer control over the process.

Why not?

- Initial cost of a printer and space to store it.
- Technical Skill required to tweak and get good results.

How does an ink-jet printer work?

- The print head 'spits' out droplets of ink.
- This is done mechanically using a quartz crystal (EPSON) or thermally by making a steam bubble (CANON/HP).
- The ability of a photo printer to render colours and shades depends on its ability to finely control the droplet size – especially with regard to smaller finer droplets.
- Some photo printers use 'light inks' as well as the usual CMYK inks which removes the need to finely control small droplets.
- More modern printers seem not to use the light inks as print head technology has improved.
- 'Pro' printers still use 'light' inks to get the very best colour gamut.

Inks

Some printers use DYE inks and some use PIGMENT inks.

- DYE inks have the coloured dyes dissolved in a solution.
- PIGMENT inks have minute pigment particles suspended in a solution.
- DYE inks are more prone to fading over time
- DYE ink prints can be easily damaged by water or moisture.
- PIGMENT inks are better at adhering to a wide range of papers
- DYE inks require an absorbent surface to soak into.
- DYE usually cheaper than PIGMENT

RedRiver Paper have published fade test results for many inks. Their test methodology says that the end of life of a print is when it loses 30% of its colour saturation. Pigment inks seem to have a life of around 50 years. Dye inks vary between 5 and 12 years.

https://www.redrivercatalog.com/infocenter/printlife_nav.htm

Redriver also have data on print costs having measured how much ink is used in a typical photo print for various printers and accounting for the cost of the cartridges.

<https://www.redrivercatalog.com/rr/cost-of-inkjet-printing.html>

Noticable that printers with larger volume cartridges (eg Epson 3880) are the cheapest per print. No test results of 'ink tank' style printers.

Third Party Inks

Generally a lot cheaper to buy – but... Check if it is Pigment or Dye and know what your printer was designed to use.

Lots of good and bad anecdotes around which speaks to the variability of quality.

Issues might include:

- Fading a lot quicker
- Different colour density (Needs a different print calibration)
- Blocking/Clogging issues
- 'Settling' of pigments giving variable densities
- Need to manually calibrate colours

Continuous ink systems only really worth considering if you do a huge amount of printing. They can be problematic as they can easily introduce air bubbles into the print head.

These days printers with high-capacity cartridges or printers with ink-tanks are a better option.

Andy: My Epson R3000 I always use EPSON inks and in eight years has NEVER blocked. I didn't use it at all during the Covid Lockdown for 2-years and when I fired it up it worked first time.

My conclusion is if you want an easy life, stick with manufacturer standard stuff. If you have the knowledge and time to tweak and fiddle then using third party ink and papers may save you some money.

Papers

Inkjet printers work best with coated papers. The coating is designed to absorb the ink.

- With Uncoated paper the ink drops 'splat' on the surface making them larger and less dense.
- With Coated paper the ink drops are absorbed and have the correct size and density.



Decoding the names...

Matt	^More Matt
Lustre	
Satin	
Pearl	
Gloss	v More Glossy

Paper has two important characteristics –

- The amount of ink it can absorb which affects the depth of colours printable (Dmax)
 - Uncoated and Matt papers have low Dmax so prints can look more 'washed out'
 - Coated gloss/pearl type papers have higher Dmax so look more contrasty.

This is why it is important to select the paper type (Plain, Matt, Lustre, Gloss) in the printer settings so that the correct amount of ink is used.

- The brightness of the paper, which gives the lightest tones.

Paper Suppliers

- Fotospeed can be found at <https://fotospeed.com>
 - Andy's favourite papers are: PF Lustre, Metallic Lustre and Photo Matt.
 - Discount code for 15% off for Marlow Camera Club members: **FSYOUTUBE15**
- Permajet can be found at <https://permajet.com>
 - Discount code for 20% off for Marlow Camera Club members: **MARLOWCC20**
- Photopaper Direct can be found at <https://photopaperdirect.com>
 - Cheaper papers in larger quantity packs. Good value and quality
- The Inkjet Paper Girl can be found at <https://www.theinkjetpapergirl.co.uk>
 - Some more creative options here.

Which Printer?

Choice is likely to be driven by the size of prints you want to produce (A2, A3, A4) and choosing dye or pigment inks. Epson and Canon seem to be the leaders in photo printers. Epson have run 'recycling' promotions where you can trade in an old (perhaps non-working) printer for a 20% discount on a new one.

Calibration

The number one gripe people have is the frustration of printing something and then “it didn’t look like that on my screen”

(This actually goes for PDI’s as well. We often get comments along the lines of ‘my pictures didn’t look like that on my screen’)

Having your monitor set up properly will ensure the best match of colours and tones.

Brightness and Contrast

The first thing to do is check your brightness and contrast settings on the monitor.

When we use our computers for general computing tasks it is tempting to run at high brightness levels as this ‘looks good’ but if you edit your picture to look right on a monitor with the brightness turned up, it will look dark on a correctly set up monitor or when printed.

Beware that some computers have features to automatically adjust the screen brightness depending on ambient light and also battery levels. You may want to turn these features off when editing photos to enable consistent results.

Colour

Colour balance can also be set by using an ICC Profile. This is a file that contains colour correction information – it may be supplied by your monitor manufacturer or created by a calibration tool like Spyder or X-Rite.

Note that some computers have a facility to reduce blue tones during the evening to help your eyes. On Apple this is called ‘night shift’ and I’d recommend disabling it when working with images as the changing colour balance will lead to inconsistent results.

Calibration

MacOS and Windows have built-in tools to help you set up the brightness and contrast to the correct levels as well as performing some basic colour calibration:

<https://support.apple.com/en-gb/guide/mac-help/mchlp1109/mac>

<https://www.dell.com/support/kbdoc/en-uk/000194424>

<https://www.tomshardware.com/how-to/calibrate-your-screen-windows-11>

You can also buy a calibrator device to set up your screen properly. These give much better results than the basic built in routines.

Basic Spyder Screen Calibrator <https://www.datacolor.com/spyder/products/spyder-x-pro/>

Calibrite Display SL <https://calibrite.com/product/display-sl/>

My observation is that my modern Apple Laptop is very well calibrated in the factory and seem to benefit little from this process – I can hardly tell the difference between default and calibrated. It is however very useful to use the calibrator when using an external monitor.

ICC Profiles

Colour calibration of a computer screen, projector, or a printer, ink and paper result in an ICC file which can be used to convert and preview how an image will look.

Calibrating a Printer

If you are using manufacturer's inks and a standard setup, most premium photo paper suppliers will have downloadable ICC profiles for their paper with common printers.

If you are using third party inks or an uncommon printer, you can also download a printable test chart which you post off to the paper supplier for scanning and they email you back an ICC profile. (May be chargeable service, may be free with purchase)

If you have a more sophisticated colour calibration device you can print a test page and use the calibrator to make your own ICC profile.

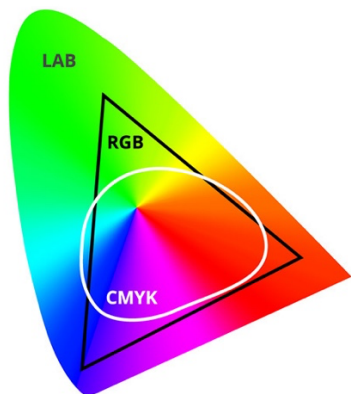
Printed versus On-Screen Differences

Although calibrating your screen gets you closer to seeing similar results on-screen and in-print, you should never expect to get the exact same results

A computer screen 'projects', Red Green Blue (and white) light to make hues and tones. The colours 'add' together.

A print reflects ambient light and therefore uses Cyan, Magenta, Yellow and Black. Since they work differently, colours have to be translated from RGB to CMYK colourspace.

Some colours in the RGB colourspace cannot be mapped to colours in the CMYK colourspace, which is why there is always a difference between how things look on screen and how they print.



Some more advanced photo printers have extra inks like blue, red , "light cyan" and "light magenta" as well as greys to try and improve the CMYK colourspace.

When your software converts between RGB and CMYK colourspaces, it can do so in several ways: Absolute, Ratiometric and Perceptual.

Absolute	Tries to match the white point and black point, between colour spaces, but as a result many hues of colour will be shifted, resulting in odd colouration. Don't use this one!	Don't use!
Perceptual	Perceptual tries to map all the out of gamut colours to in-gamut colours by squishing them all inside. This preserves the colour detail in stronger colours but at the expense of subtly shifting less saturated tones. Usually a good starting point for most images.	Use when an image contains strong colours
Relative	Relative tries to keep the colours that exist in both colourspaces exactly the same.	Use when an image contains subtle hues (skin tones)

	<p>Colours that are out of gamut are saturated to the closest in-gamut colour.</p> <p>This results in loss of detail in strong colours so it best used for images with more subtle toning.</p> <p>Best for subtle tones images where you need higher colour matching accuracy, portraits with skin-tones for instance.</p>	
--	--	--

Soft Proofing

Soft Proofing allows you to preview how a print will look. Typically, it requires the ICC profile for the Paper and Printer so it can work out what it will look like.

Affinity: <https://lenscraft.co.uk/photo-editing-tutorials/affinity-photo-printing-for-photographers/>

Photoshop: <https://gregbenzphotography.com/photography-tips/how-to-soft-proof-easily-in-photoshop/>

Lightroom: <https://lenscraft.co.uk/photo-editing-tutorials/what-is-soft-proofing-in-lightroom/>

Once you turn soft proofing on, you can adjust the image to appear as you want in print.

Monochrome Printing

Inkjet printers actually use the coloured inks to get monochrome shades of grey.

If your setup isn't perfect then you will get strange colour tints, and it can be hard to get rid of entirely.

You may find a more creative answer is to 'tone' your print deliberately, as a toned print looks like it has been done on purpose, whereas an 'almost grey' print looks like a fault.

Most photo printers have a 'Monochrome' setting in the printer settings that you can turn on which can help a lot.

Maintenance & Troubleshooting

Keep the covers closed when not in use, and use a dust cover. Dust ingress can cause all sort of issues!

Printing on Matt paper can leave dust inside the printer – clean it out regularly.

Coated paper can leave residue on the rollers. This can cause paper feed issues.

Paper feed issues can often be solved by cleaning the pickup rollers with alcohol and a lint free cloth or swab.

Ink splodges on the edges can be caused by having the incorrect paper thickness set in your printer settings.

Nozzle problems often leave horizontal striping or bad colour balance. Try a head clean.

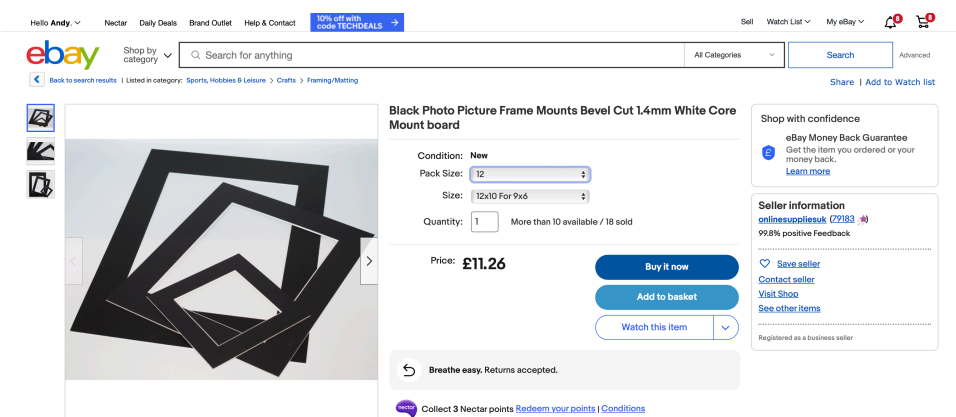
Ink cartridge recognition problems sometimes caused by bent contacts inside printer.

Many printers have a waste ink tank inside that collects ink during cleaning cycles. When it fills up the printer stops working. You will need to have the printer serviced to empty the tank and reset the printer, however if you look around YouTube you may find a video showing how to do this yourself.

Mounting Prints

Traditionally, photographers use bevel cut back mounts for displaying their prints, however there are alternatives that may be more suited to a novice or if you're short of time.

If you are using a standard sized print, then you can buy pre-made bevel cut mounts. Search on eBay for 'Bevel cut mount' and you'll find a bunch of them in different sizes and colours. I picked up some for 9x6 prints for 94p each:



Why not print a 2mm white border around your image and then print a coloured border around that? You can pick a colour from the image or choose a complimentary colour. The printer then prints the border. It then just needs trimming and mounting onto some stiff card. This has the advantage that you can use any colour for the border without having to buy it.

You can do this and print directly on to photo card stock – eliminating the need to mount onto card.

You could dispense with the coloured border entirely. You may or may not keep a white outline at the edge.

These may be easier but if you do try them, you'll notice some of the advantages of the bevel cut back mount:

- The mount gives a safe edge where the print can be handled without risk of damage.
- If you stick a print to a piece of cardboard it may 'bubble' with variations in temperature and humidity.

Club Rules regarding Prints

Prints:

- To be stiffly mounted on mountboard, card, or similar material.
- Unless otherwise stated the mount shall have a minimum size of 17.5cm (long edge) by 12.5cm (short edge) and maximum size 50cm (long edge) by 40cm (short edge).
- The title and the member's name to be clearly displayed at the top of the reverse side of the mount.
- The member's name to not be displayed on the front of the print or the mount.