

## **Moving to an All-Digital Platform – Laptop and Projector**

The authors are on the committee of Witney Photo Group. We had already made the decision to buy a Canon SX80 Mark ii some 2 years previously, and we needed to upgrade our computer to take advantage of its improved facilities.

We decided on a laptop for portability and wanted to send a 1400 x 1050 (SXGA+) image from the laptop to the screen using a digital connection, avoiding distortion of the image. The mass market for this equipment is geared towards DVDs, televisions, Blu-Ray etc., all using 1920 x 1080 (full HD) or 1366 x 720 (HD), both having an aspect ratio of 16:9.

After a fair amount of research, having achieved our aim, we felt that it would be helpful to other clubs to explain our conclusions. This proved much more difficult to do, than to achieve the result in the first place, partly because our description was not precise enough, and partly because some aspects are genuinely difficult to describe, or are counter-intuitive.

Having withdrawn our original report from the CACC site, we have largely rewritten it. The detailed account comes first, but if you want a simpler summary this comes at the end. If neither approach works for you please feel free to contact the authors, Brian Lee (01993 779998 or [wpgprogsec@btinternet.com](mailto:wpgprogsec@btinternet.com)) or Andrew Whitehouse (01993 771042 or [andrewpw@ntlworld.com](mailto:andrewpw@ntlworld.com)). We are of course fallible and all we wish to do is to assist other clubs.

### **Why bother with digital?**

Until it became possible to move from 1024 x 768 to 1400 x 1050 there seemed little point in moving from analogue to digital. Most clubs had been using analogue equipment which had been operating satisfactorily for a number of years. However connectivity on both laptops and projectors moved on from VGA to DVI in its various forms (all except DVI-D are analogue/part analogue) and thence to HDMI. The received wisdom was that little benefit could be derived by changing and that most people would not notice any improvement.

It is unfortunate that digital has become such a buzzword that we have lost sight of its meaning and significance. All analogues are representations in another form, whereas a digital signal in its developed form is absolute. We are still a long way off that goal, and it may be some years before a signal can be considered purely digital, from camera to screen, projector and paper.

However developments are moving towards digital, and it makes sense to use the latest available connectivity when buying any new equipment. We cannot always be in the vanguard of progress because of the expense, but we should take advantage when improvement becomes affordable.

### **Detailed Account**

We started at a well-known PC retailer and asked how we could use one of their laptops to send a 1400 x 1050 image to our club projector (Canon SX80 Mark ii). It was perhaps an unfair question as laptops are widescreen and designed to send HD video pictures and not 4:3

images. Our initial efforts were unsuccessful, because, as we subsequently discovered, a full HD laptop was required with a separate graphics card.

Separately we had available a Sony Vaio full HD laptop which could send a 1400 x 1050 image to the club's projector, a Canon SX80 Mark ii, via its DVI-D connector. If we used an HDMI –HDMI lead we found that it resulted in a clipped image.

Using the full HD laptop and a full HD projector (Sanyo PLV Z3000), would also work, in this case with an HDMI – HDMI lead.

In both cases the laptop graphics card was set to 1400 x 1050 to achieve an undistorted image. The question has been asked as to why we did not send the image to a full HD projector at its native resolution of 1920 x 1080. Whilst it is possible to do this the image with resolution 1400 x 1050 is shown by the projector as a 4:3 image within the 16:9 envelope. In this form the image is therefore smaller to allow for the taskbar and icons distributed as you would expect on a 16:9 screen. If you then expand the image to fit the screen the controls on the taskbar are off-screen and therefore not visible and useable.

Another important setting to note is that the laptop graphics card must be set to clone (duplicate) and not to extend. Unlike analogue signals “extend” does not work in this context

The resultant picture on the laptop monitor will of course be appropriately reduced but this should not present any difficulties.

Having got this far we needed to understand why a full HD laptop was required, as clearly this involves greater expenditure; we therefore made an enquiry on the Nvidia site with regard to their graphics cards, explaining our requirements (particularly relating to the Canon projector). We were rewarded with a very full response, which is applicable to all laptops and projectors.

Contrary to our preconceived ideas modern graphics processing units (GPUs) query the projector to establish which resolutions are supported. A signature file in the firmware known as EDID is responsible for providing this information. For those who wish to know more about EDID, simply Google these initials to read the Wikipedia and other articles on the topic.

Nvidia advised us that we could use a utility on a laptop called Monitor Asset Manager to interrogate any connected projector and obtain its EDID properties. The utility can be downloaded from the link shown here: <http://www.entechtaiwan.com/util/moninfo.shtm> This is free for personal use but it does need to be downloaded onto the computer with the projector attached on each occasion – you cannot copy the download from one computer to another.

If you then launch the utility, click on the “Report” button at the bottom , click “OK” when the Monitor Report window opens, right click anywhere in the report window and select “All”, you can copy and paste this information to your word processor. This report will confirm the native resolution of the projector (which will probably be in your manual anyway) but more importantly you will then be able to choose a laptop which offers this

resolution through its graphics card. Nvidia provided the following detail, which you may wish to take advantage of, to select a laptop with an appropriate GPU.

“The standard resolution support depends upon the ports and the graphics card model and all newer GeForce cards (GeForce 6 and higher) support the standard resolution based upon the ports. The supported resolutions are:

Single Link DVI: Up to 1920 x 1200

Dual Link DVI: Up to 2560 x 1600

VGA: Up to 2048 x 1536

HDMI: Up to 1920 x 1080

Nvidia list their current notebook GPUs which will support these resolutions: Geforce GTX 580M, 570M, 560M and Geforce GT 635M, 630M, 555M, 550M, 540M, 525M, 520MX, 520M and Geforce 610M”.

We must emphasise that ,although Nvidia were very helpful, it is very likely that all mainstream graphics card manufacturers adhere to the EDID standards. Care needs to be taken with older cards, particularly from other manufacturers, where you have no confirmation of their compliance; also please note that some cheaper laptops share main memory for their graphics functions. Our enquiries suggest that the system described will only work with a separate card, but we are ready to be proved wrong if anyone knows better.

## Summary

Please note each of the following requirements carefully and ensure your equipment complies:

**- this has only been tested with Windows 7.**

**- a laptop must be full HD** with a **separate graphics card** offering 1400 x 1050. We understand that this is because 1400 x 1050 will fit within the full HD resolution of 1920 x 1080.

**- a clone (duplicate) setting must be set on the laptop.** Empirically we have discovered that extended settings do not work.

**- the projector must have an HDMI or DVI-D input.**

**-empirically we have discovered that the Canon SX80 Mark ii must be connected with a DVI-D connector at the projector end.** This appears to tell the graphics card that its native resolution is 1400 x 1050. Full HD projectors need to be connected with an HDMI –HDMI lead.

**Please note that in all cases the connection must be digital (HDMI or DVI-D).**

**DVI (digital video interface) comes in a number of versions – only DVI-D is digital)**

## **Conclusion**

**Neither the authors nor the CACC can take any responsibility for making the correct choices of hardware, software or connections, so check and double check everything. In particular we were only able to confirm our findings on one full HD projector (Sanyo PLV Z3000).** If anyone else can confirm that others work equally well, as we would expect, please do let us know.

Our club now has a full HD laptop from Dell, with one of the specified separate graphics cards from Nvidia, which works in the same way as the Sony laptop (which incidentally has a ATI card).

Good luck,  
Brian Lee and Andrew Whitehouse.