

Hands on Multimedia: Scanning with

Still images form a vital part of many multimedia products, and Acorn users are fortunate in that there is a wide selection of both hardware and software to transfer images from the real world to the virtual world of the computer.

And while the most obvious approach here is to use a scanner of one form or another, the alternative of using a video camera with an image grabbing board can prove to be a much cheaper proposition - though usually with a loss of overall resolution.

In this article I am going to take a look at using a traditional flatbed scanner. But instead of using proprietary software designed specifically for that scanner, I will be using David Pilling's ImageMaster with a so-called Twain driver.

Enter Twain

Twain is an industry standard interface for image acquisition, developed by a consortium representing major companies such as Aldus, Eastman Kodak, Hewlett-Packard and Logitech. It works much like the Acorn printer drivers, in that any application which acquires images need only contain the code for a single Twain interface in order to be able to use any type of image scanning device, providing that there is a driver for that device.

This represents a major advance in that it becomes viable for the writers of graphics and DTP packages and the like to include Twain scanning code so that you can scan images in, directly under the control of the application for

which they are intended. This is already the case on rival platforms with software such as Photoshop, Page Maker WordPerfect, and so on, all of which have a Twain interface.

David Pilling has written the code to make use of this industry standard on the Acorn platform, and has created Twain drivers for a number of scanners, including:

- The Hewlett-Packard ScanJet
- The Epson GT scanners
- The Canon IX scanners
- The Integrex CS300
- The Mustek Paragon
- The Microtek Scanmaster II

and the Nikon Coolscan. The latter is a neat little scanner for 35mm colour transparencies or colour negative film. It operates at a resolution of 2700 dpi, and will sit in a 5.25 inch drive bay - and can thus be internally fitted to a Risc PC.

The Canon IX-4015

We will be dealing with a slightly less exotic beast in this article: the Canon IX-4015 A4 flatbed scanner. This is capable of full 24-bit colour scans at resolutions of up to 400 dpi (dots per inch) x 800 lpi (lines per inch), and it does this in a single pass taking only a matter of seconds. One of the ways in which it achieves this is that an angled mirror, rather than the CCD scanning head, does all the moving. The scanning software that I will be using is ImageMaster from David Pilling, which is one of the few pieces of software

This month Lee Calcraft turns his hand to the acquisition of still images

currently able to use the Twain drivers on the Acorn.

Setting the whole thing up is very easy indeed. The Canon scanner has a SCSI connection, and providing your machine has a SCSI interface, all you need to do is connect the SCSI lead, and adjust the thumbwheel at the rear of the scanner to set a SCSI address which does not conflict with any other device you have connected. If you are not equipped with SCSI you will need an interface board - check with your Acorn supplier.

ImageMaster

ImageMaster is also pretty easy to use. The only thing you need to do is to ensure that your OS has seen the !Twain directory so that it knows where to find the Twain drivers. You can then double-click on the ImageMaster icon to install it on the icon bar. Clicking with Select on this opens the main scanning window, and everything is controlled from the menu on this window. For example, this is where you select which Twain driver you want to use (see figure 1).

If everything is in place, you can select Acquire. This all-



Figure 1. Twain in use

important option, found on the File submenu, should really be at the top level, because the dialogue box which it generates controls all aspects of each scan that you make. However, the handy shortcut on F10 makes it instantly available.

As you can see from figure 2, this window has four radio icons at the top. Each of these changes the central section of the dialogue box, allowing you to select either the type of scan (e.g. whether you



want greyscale or colour, and to what pixel depth), the quality (with sliders for brightness and contrast), the area scanned, or the resolution.

We will get straight into the practicalities of scanning a picture rather than enumerate each of the set-up options in detail. The picture which I have used for these tests is a 6x4 colour print of a 35mm colour negative which we took of the Psion

Series 3. I have chosen this particular picture for the tests because the image contains a high degree of detail at a wide range of contrasts, and because most readers will have a fair idea of what it should look like.

The best way to proceed with ImageMaster is to use the very useful Preview option. This scans the whole A4 image area in black and white in a matter of seconds, and displays the resultant image in the main viewer. This allows you to move a set of crop marks to the exact position required. When you perform the next scan ImageMaster tells the scanner (via Twain) to scan only the selected area.

The next job is to decide both the type of image that you want, and the resolution. This will obviously depend on what you are going to do with it afterwards. But suppose we begin by selecting 8-bit colour (i.e. a 256-colour palette), and a resolution of 100 dpi. ImageMaster automatically tells us that the image will be 212K

in size, even though the image area is a modest 6x4 inches. If you go to full colour at 400 dpi you get a horrendous 10Mb - just for one small picture!

The 100 dpi 8-bit scan took 12 seconds, and looks very dark indeed on screen, although the



Figure 3. Comparing 100 dpi images. The left-hand images are from 100 dpi scans. The image on the right was scanned at 200 dpi, and rendered at 100 dpi

picture itself does not seem particularly dark to the naked eye. We can fix this by taking the Brightness control up a notch or two, and rescanning. The result is a much better balanced picture, though the on-screen resolution looks poor (see figure 3, top-left window). To check the true quality of the image we need to load it into Paint or some other art package.

ImageMaster's Save box offers no less than nine different file formats, including sprite, clear file, PCX, JPEG GIF and TIFF, and will happily save 24-bit sprites even on a machine that does not understand 24-bit colour. Saving the result as a sprite and looking at it in Paint (figure 3, bottom-left window) again reveals some very wavy lines. The reason for this is that the scanner output is not dithered. We can get a far better 100 x 100 dpi image in 256 colours by scanning at a higher resolution (say 200 or 400 dpi), and then using ChangeFSI to generate the required 100 dpi image using its intelligent dithering process. The



Figure 4.
A 400 dpi scan of a 6x4 colour print at 256 colours contains excellent detail

image in the right-hand window in figure 3 is still at 100 dpi, but it has been scanned at 200 dpi, and scaled down to 100 dpi in ChangeFSI with dithering turned on. The result, as you can probably see is far superior. Scanning at 400 dpi, and then using ChangeFSI to dither down to 100 dpi improves the quality still further, but the improvements here are much more marginal.

Another very useful trick in ChangeFSI's repertoire is the Gamma correction option on the Processing dialogue box. By setting a degree of gamma correction you differentially lighten an image (lightening the dark parts more than the lighter parts). This can be very useful for photographs which exhibit a wide range of brightness. If you simply use the Brightness control on ImageMaster, the whole of the image becomes lighter, and although this allows you to see the dark bits, it can make the light bits too light. By setting the gamma correction to a suitable value (found by trial and error for each image - though I have had good results with 1.7) you can vastly improve image quality.

Resolution and Quality vs Image Size

But the real problem is what resolution and quality to go for in any particular situation. This of course will always be a trade-off.

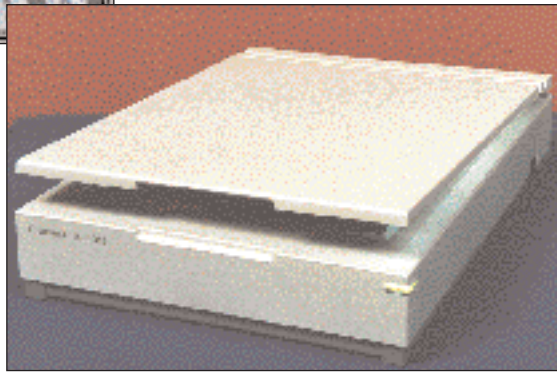


Figure 5.
The Canon IX-4015 (photographed with a Canon EOS 5, and scanned by itself)

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Twain Driver
ImageMaster
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Generally speaking you want the highest quality image, but without using up too much memory. And it also depends vitally on how the image will be viewed. If it is to be viewed on screen, you need a much lower resolution than you would for publication.

Take for example the 100 dpi scan of our 6x4 inch colour print. This image is 600 x 400 pixels in size, which when displayed in Mode 21 or 28 takes up almost the whole

screen (Mode 28 is 640 x 480 pixels). If on the other hand the picture is destined for printing in a colour leaflet, or a magazine or book, you should aim for at least 300 dpi at the size at which the picture will be printed. To take a practical example to illustrate the point, suppose we were going to put the Series 3 picture onto a magazine page, and had allocated

a slot for it 3 inches by 2. We would need to supply an image of sufficient resolution to give 300 dpi on the page. In other words, it would need to be at least 900 pixels by 600. We could achieve this by scanning our 6 x 4 inch picture at 150 dpi - or better still, scanning it at 300 or 400 dpi, and then using ChangeFSI to scale it down. This is exactly what we have done in figure 5. This picture of the Canon scanner was photographed on colour negative film, and the 6x4 inch print was scanned on the Canon at 400 dpi. ChangeFSI was then used to scale it to an on-page resolution of 300 dpi, all in 24-bit colour.

If all goes well, a close scrutiny of figure 5 should give a good idea of the kind of quality that can be achieved in this way. But in any case, both scanner and software have performed faultlessly in the thousands of scans which we have made with this reliable combination.

