

Star has gained the reputation of a company that provides run of the mill printer technology at affordable prices, rather than being particularly innovative. However, as this review will show the launch of the SJ-144

The Star SJ-144 Colour Printer

David Spencer investigates a significant advance in colour printing for the Arc.



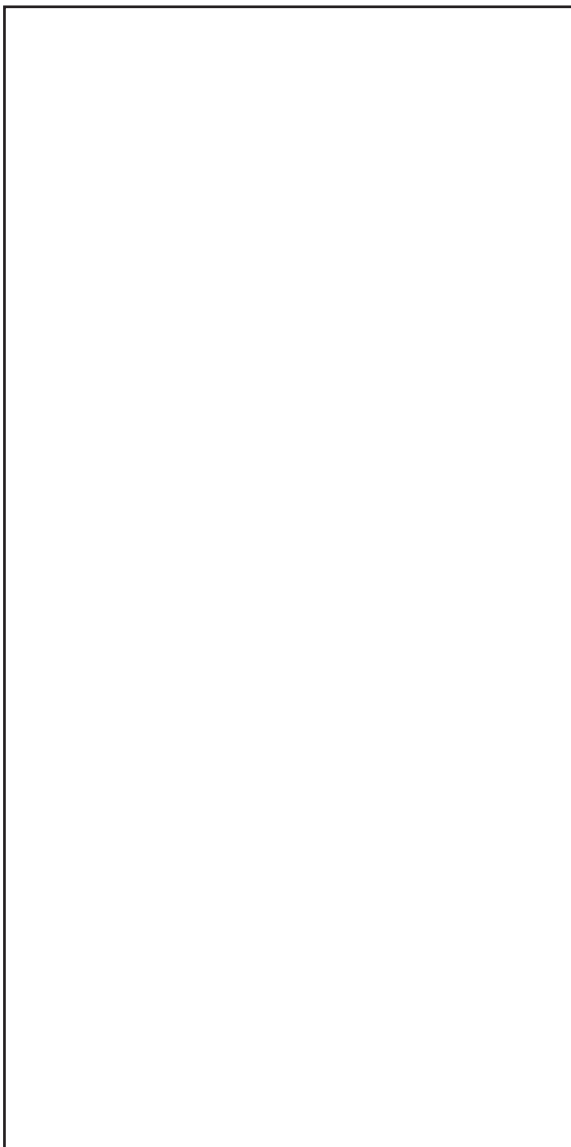
Text and graphic printed at 180 dpi

Thermal Transfer colour printer is set to change all that.

THE HISTORY OF COLOUR PRINTING

Whilst black and white printing technology has evolved tremendously over the past decade, the movement in colour printers has been much slower. Until a couple of years ago, most colour printers used ribbon-based impact techniques, similar to those used on cheap dot matrix printers. However, these produce poor output, damage the paper, and are very prone to even slight deterioration in ribbon quality. The next stage was the introduction of ink-jet colour printers which replace the ribbon and striking pins with a spray of coloured ink. This type of printer, which currently accounts for most colour printers sold, offers greatly improved quality but suffers from the need for high grade paper to avoid bleeding of the dots.

Following the lead of monochrome printers, you would expect the next step up to be colour laser printers. However, while there are such printers, the idea never really caught on because the xerographic printing process used doesn't really give the desired results when trying to mix colours. Instead, the move is towards a technique called Thermal Transfer Printing. With this method, a wax-type ink is actually melted onto the paper from a carrier sheet. There are separate carriers for each primary colour (cyan, magenta, yellow and black), and for any pixel, each colour can either be melted on or not. Because they are melted from the



Graphic printed
at 180 dpi

solid phase, the inks can be made more waxy than liquid ink, preventing smudging and

allowing good quality output on almost any grade of paper (or film).

Incidentally, there is an extension of the thermal transfer process called Dye Sublimation, and this allows varying intensities of ink to be melted for each dot, rather than just ink or no-ink. The next generation of printers using this technique will allow each dot to be one of many millions of colours, alleviating the need for dithering, which reduces, the effective resolution.

Traditionally, most thermal transfer printers



Text printed at
360 dpi

have used carrier sheets the same size as the page being printed. So, for example, to print on A4 paper, four A4-sized ink carrier sheets would be used - one for each primary colour (and black). These sheets are usually mounted in sets on a roll. Unfortunately, this method bumps up the price of the printer (to about £2500) because of the complex mechanisms needed, and makes each copy very expensive (pounds per sheet rather than pence!).

ENTER THE SJ-144

This is where the SJ-144 comes in. What Star has done is to take the thermal technology, but do away with complete ink sheets. Instead, they have put strips of ink sheet into a fairly standard ribbon cassette. This has the slight disadvantage that the page is printed as a series of strips, which can give some banding in the picture, but the technique has several advantages that outweigh this. Principally, the simplified mechanism needed, and its similarity to normal dot matrix printers, reduces the overall cost considerably. Secondly, the use of a ribbon cassette is more economical when printing pages containing only small areas of colour, as entire ink sheets aren't wasted for

only a few dots. Indeed, these changes have meant that star can sell the SJ-144 at the incredibly low price of under £500 (see later).

The SJ-144 follows the trend towards printers that look more upright than flat, with a footprint of 13 by 5.5, and a height (without paper) of 7. The case is in a nice cream colour that matches the Arc well, with a fold-down paper tray on the back, and a fold-up panel on the front, the lower half of which is in dark smoked perspex. On the top of the printer are an on-off switch and density control, and a panel carrying four push buttons and fifteen lights, these being used to set the usual options found on a printer, such as auto-linefeed. A compact external power supply unit is used, and this plugs into the side of the printer, with the data cable plugging into the rear.

As well as colour printing, monochrome is supported by use of a single colour ribbon cassette. Both mono and colour ribbons are available in normal versions, and special types for use with over-head projector (OHP) film. There are also special label ribbons that print directly onto self-adhesive label strips contained within the cassette. These are available in a number of colours. Changing between ribbon cassettes is very easy, even in the middle of printing a page.

The SJ-144 provides for three types of paper feed, coping with paper from 4 square to 9.5 wide by 14 deep. In the normal mode, paper is fed from the paper tray and comes out of the front. Up to thirty sheets of paper can be put in at one time. For OHP film and card, paper can be fed one sheet at a time from the rear. This offers a straight-through paper path to avoid jamming. Finally, single sheets of normal paper can be fed from the front, and re-emerge at the front.

PRINTING

Once you have connected the printer to the mains power and to the computer, and turned it on, there is not much more to do before you start printing. This is because the printer can automatically detect the codes being sent to it, and configure its emulation automatically.

Therefore, it is simply a matter of loading the printer driver and starting to print.

The SJ-144 supports both Epson LQ-860 and IBM X24E printer emulations, up to resolutions of 360 dpi. For printing from RISC OS 3, the Epson LQ-860 driver can be used. The only slight problem is that this doesn't actually support colour at 360 dpi (only at 180 dpi and below), due to limitations in normal dot matrix printers. However, this can be fairly easily modified, and in most cases 180 dpi is adequate for colour output anyway. I guess that most dealers selling the SJ-144 will supply the modified driver for a nominal charge.

On the first full-colour printout, I found two faults with the quality. Firstly, the print was very dark, and secondly, there was prominent banding across the picture (each band corresponding to one pass of the ribbon). Luckily, the printer can be adjusted to correct both of these problems. The darkness is controlled by means of a small thumb-wheel intensity control next to the on/off switch. I found that the best way to adjust this was to print out a dump of the desktop, and slowly adjust the control down as printing continued until the contrast between the Desktop background and icon bar looked correct. Once set, the intensity control should not need adjusting again.

The banding can be reduced, and indeed almost eliminated, by means of a special set-up mode that fine-tunes the spacing between passes in units of 1/360. This mode is entered by holding down buttons on the printer when powering up, and works by printing out a series of test patterns that you must assess, and press the appropriate button to adjust if needed. This is described fully in the user guide.

The time to print a screen-dump covering about 80% of the page at 180 dpi in full colour was about five minutes, with control of the computer being returned in just under four minutes. Using greyscale output at the same resolution, the print time was about two and a half minutes. Both tests were done on an A5000. In text mode, the print speed is up to 500 characters

per second.

The only real fault I found on the SJ-144 in use was the reliability of the paper feeder. As long as you have a reasonable quantity of paper in the tray (about ten sheets), all is OK. However, too much or too little and you can get two sheets fed at the same time, or worst still, none at all. In this latter case, the paper does get as far as the paper detector, so the printer thinks all is well and starts to print all over itself.

RUNNING COSTS

With any high quality printer, one important consideration that is often overlooked is the cost of each individual page printed. Whilst most mono dot-matrix printers will churn out a page for fractions of a penny, some high-end colour printers work out at around £5 per page. Luckily, the SJ-144 doesn't reach these extremes!

Monochrome ribbons for the SJ-144 cost £10 each, and according to the specification, will last for 345000 characters. This corresponds to about 100 pages, giving a cost of ten pence per page - not dissimilar to a laser printer.

As would be expected, colour output costs more. A colour ribbon sells for £12, and will only last for eight pages if there is a uniform spread of colour over the entire page. This is typical of the output produced by a full size screen-dump, or scanned or digitised picture. Therefore, the cost for this type of output is a rather high £1.50 a page.

For colour DTP-type output, where you would typically have only a couple of colour pictures on a page, the cost is likely to be reduced to about fifty pence a page, with a ribbon life of 24 or 25 pages.

Whilst these prices may seem high, the typical costs of one page of full colour output from a DeskJet 550C is £1.42, so the Star costs about the

PRODUCT INFO

Product	Star SJ-144 Colour Printer
Supplier	Star Micronics UK Ltd
	Star House, Peregrine Business Park , Gomm Road, High Wycombe, Buckinghamshire HP13

The SJ-144 has a recommended retail price of £569 + VAT, but is available from Beebug at £475 + VAT.

