

# THE CASE FOR THE FLATBED

BY DAVID KING



Does a flatbed printer have a place in your shop? Can you justify the purchase price?

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**F**LATBED IMAGING is not new; as a matter of fact we have been doing it for hundreds of years. Flat bed imaging is the oldest way of putting ink on paper. Today we put images on just about everything and we do it flat. Screen printing for example, uses a process of burning an image into a mesh screen and running ink through the screen onto a substrate.

Really, what they do is cover the screen with an emulsion that clogs the

pores of the screen, then expose the area of the screen to be hardened (stay clogged) to UV light. Once this is done, the rest of the emulsion is pressure-washed away, leaving the area where the ink will flow through the screen onto the substrate.

Each color applied to the substrate requires a new screen, so a four color job will require four screens. The screen printing industry uses a number of inks, some harden (cure) with hot air, while others harden with UV light. It's a successful industry because images can be put onto just about anything and with any color (white, gold, silver, etc.). Plus they can do thousands of images with very accurate color. The disadvantage to screen printing is that the setup time and materials needed is too much to justify small runs. So why would a sign shop want to get into screen printing?

Great question...

And the answer is money, flexibility, diversification, and control! Let's be serious, in most cases, sign shops owners have the ability to create and manufacture unique signs — to help another person's business get noticed and be more successful.

The key is to run a sign business and not lose control. I have found two types of sign companies, the creative sign company and the business sign company. The "creative" comes from a very talented artist that has the ability to create just about anything; the "business" shop is run from a more financial basis where cost and return on investment (ROI) is more the focus than the creative.

Neither of these are better than the other but in a town or area you need both! The "creative" sign shop will have a difficult time justifying a flat bed printer, because they make their money on the unique jobs they do, not the 100 prints that are all the same! The "business" sign shop will want to get one of these flatbeds

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UV curable inks will stick to any surface that will fit in the printer — like the inset image printed for test purposes onto pink insulation. UV-curable flatbed printers represent a considerable investment, but if you look at exactly how they might be used in your shop, you may be surprised at the potential for profit.

Image courtesy of Design Force



This 144" x 30" bus king was printed directly onto .040 polystyrene and mounted to the side of an RV using a UV-curable flatbed. A close-up from one foot away shows that the print quality is quite remarkable.



The image on the left was printed directly onto high-quality DiBond with a UV-curable flatbed printer, while the image on the right was printed with a Lambda and mounted to Gator board. The photo was taken from approximately two feet away.

soon because the signs, posters, banners, flags and all the other unique items that a flatbed can offer will get them to the level they need and want to make more money!

The problem is the cost of flatbeds are high today, but sit back and enjoy this article, and I am sure you will soon see how and when you should take the plunge into flatbed printing.

#### LET'S START WITH INK

Today I have counted at least nine flat bed printers on the market; some use

water-based inks, some use solvent-based inks, but for now I will be concentrating on UV-curable inks. The reason for UV curable is that these inks will stick to any surface that will fit in the printer and in most cases print a fantastic image onto just about everything! When I say everything, I mean Sintra, DiBond, Foam-Core, Fabric, Vinyl, Wooden doors, steel plates, pottery, automotive parts, carpet, Sign Foam, plaster, glass, acrylic, cardboard, wicker, fiberglass, Astroturf, picture frames, books, screen doors, hardwood floors, conference tables, school

desks, leather, ceiling tiles, arts and crafts, and even sand.

Not all materials have the same adhesion but in most of the cases I tested the results were outstanding. The UV curable inks are so fantastic because they are thick and heavy — so thick and heavy they can cover up most of the surfaces they are printing on so evenly, that if the surface is not pure white, the ink will cover it up. But this does not mean that you can print on black; you should stick with white surfaces as they will give you the best color output.

The UV ink is not cheap; about \$200+ per liter and since I pay about \$40 for solvent ink I think this is expensive. But if you look at DyeSub ink at \$200 to \$650 per liter, the UV curable inks appear to be a great value. Just so you know, this UV ink is not the answer to all your printing needs — it's not designed to go on cast vinyl that will be installed on rivets, compound curves and anything that requires the material to be stretched. The reason for this is that today the inks are stiff and could crack if stretched — but stay tuned; as things change so will the inks.

One more item you might want to budget for is a liquid coater that can support boards as wide as your printer. I tested products like Coroplast and found that the ink did not stick to this surface as well as I would have expected, so I had a board liquid-coated and the image did not scratch off and added years of UV durability to the image. (Plan on about \$6,000 to \$60,000 for this liquid coater.)

#### ON TO THE TECHNOLOGY

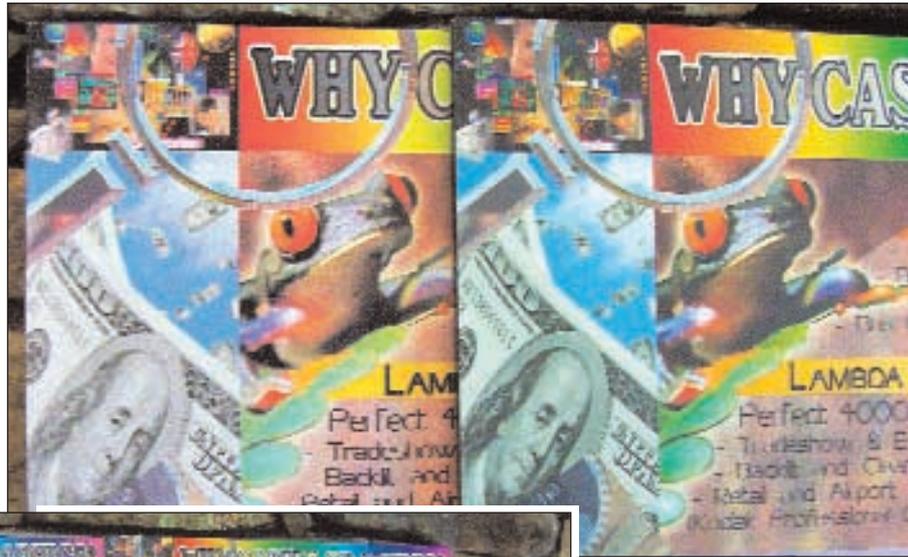
As you might know from other articles on flatbed printers, they work by applying UV curable ink to the surface, just like a solvent printer does, but less than half a second later a UV Light hits the ink and cures the ink to the surface. The UV lights are attached to the moving head so the curing is always consistent. The trick I learned is that the ink is not truly cured until 24 hours later. I learned this by going to Vutek for the day and taking a pile of materials for testing. The material I needed to work was DiBond so they printed a few 4x8 sheets with a bunch of 12" x 16" images and then turned the

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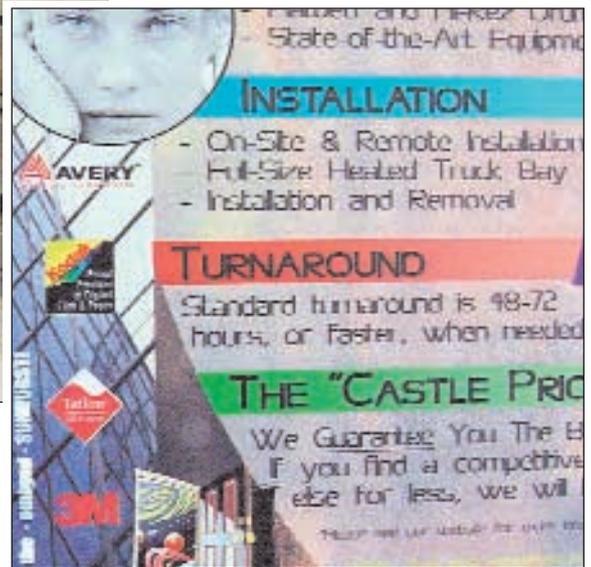
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This close-up of the same image shows how the flatbed stacks up against the Lambda with black and white images, intricate textures and bold colors.



(Above) The image on the left was printed directly onto FoamCore using a UV-curable flatbed printer. The image on the right was produced using a Lambda image setter. You may want to note that the quality of the flatbed print on both FoamCore and DiBond are remarkably similar.

(Right) This is an extreme close-up of company logos ranging in size from 1 1/8" x 3/8" to 3/4" x 3/4" with extremely small font sizes.



sheets over and printed the same images on the other side.

The registration was perfect. I took the sheets back to the office and cut them up on the panel saw. In doing so I noticed that the images were scratching off the DiBond and I was concerned. The next day one of our sales people tried to scratch off the image and could not, so the lesson is to make sure you allow 24 hours before you deliver the graphics to the clients.

In some printers the heads travel back and forth across the material as the material is moved through the printer on rollers, while other printers move the whole bed back and forth as the heads move slowly across the width of the substrate.

Understanding the difference between the two major printing methods requires you to determine what you would use the printer for in your shop. This is a tough question as you cannot really know what you will use the printer for in all cases, as sales people will find new markets for things you would have never thought of.

In our case we need to print on every size of substrate that we offer today and that is the standard 4x8 sheets, 5' x 10' DiBond 144" x 30" Bus Kings, all the way to the 100" x 100' rolls of 3/16" Lexan for outdoor backlit signs. Along with the rigid substrates, I would like to print on rolls of fabric, .020 polystyrene, and carpet. As I learned with all the different printers some can print roll-to-

roll, while others cannot; some can print 144" x 60" sheets while others cannot; and some can print on thicker materials, like 4" thick, while others cannot. Each of these features can be an advantage if you need them, or can be the loss of a sale if you cannot do them. Something to think about when reviewing the different machines.

**QUALITY OF PRINT**

This is huge for me because like most of you, I sell the quality. With a Durst Lambda for poster and backlits, Mamaki JV4 for DyeSub, and a NUR Fresco for vehicle and banner graphics, we produce the best output anyone can claim. So when I want to look at a flatbed printer the quality broken down into color gamut

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**These images were printed directly onto tile.**

**New white inks that have arrived on the market recently will enable printing on just about anything.**



(how wide is the color range), how glossy is the ink, how clean are the contrast areas (like type and four-color lines on white background), and what performance price do I pay for best quality?

Color gamut: I have the Pantone chart that I like plus four images that are very good for color gamut. I ask the manufacturers of the printers to print these images on a standard substrate like FoamCore then I compare them. You will be amazed as to the difference between the manufacturers' inks. Then I look at the glossiness of the ink, the four-color black, and the reds, blues, greens, and see how the yellow looks at 100 percent. When my customers see glossy ink they think quality and this is important for my image.

Now for the most important: how small can the type go before I cannot read it? How many 1-point lines can I put next to each other before they become a sea of spots? How clean is a four-color

black vs. a one-color black? Does the manufacturer support four-color black or is the black they make so good you do not need four-color black? In most cases a one-color black will always produce a cleaner letter than a four-color black.

And finally what price do I pay for this high quality or do I get this all the time? I found that most of the manufacturers have multiple modes for the printer to run in, and in the highest quality mode the price for speed was high; sometimes the speed was only 30 percent of what was claimed in the brochure when they ran in what I considered to be the only mode I could sell!

Speed: What is speed anyway? When a printer prints something so fast your finishing staff cannot even look at it for an hour, is this considered fast enough? Yes — except when you really need to hit a deadline and then — NO! Speed is a great feature to throw around but let's take a very efficient shop like mine. I

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## CONSIDER THE OPTIONS

When you consider the options available today on these flatbed printers you must look at all the options. Here is a list of the items that I would evaluate when it comes to the purchase of the new printer:

**Head warranty:** Are heads covered if I purchase ink from the manufacturer? If not, how much are heads and how many square feet are they expected to go before failing?

**UV lamps:** How long do they last; how much do they cost? Must this cost be added into your square foot cost of printing?

**Sheet feeder or substrate feeder:** Does the system have it or can you get one? How much volume do you expect to run?

**RIP & Cut Files:** Does your RIP create the cut file for the images so you do not have to? How does it handle jobs that are longer than the cut bed?

**Ink Colors:** 4/6/8 color, and white? With white you have almost no limitations. Six-color is best for blends and fades.

**OverPrint:** Does your printer overprint/full bleed the image on the substrate? If so, how? Does it require special hardware? Is the hardware included? What price do you pay for overprinting, such as new belts or clogging the feed system?

**Roll Feed:** Does the printer support roll-fed material, both feed and take-up? Does it have slitters to cut the rolls as they come off?

**Guides:** Does the printer have a guide system to help move long sheets of material through without walking?

**Head Height:** How thick can the material be? Do the heads adjust automatically or do you have to do it by eyesight?

**OutFeed:** Can the system feed the sheets out after being printed so they can go to the cutting table automatically?

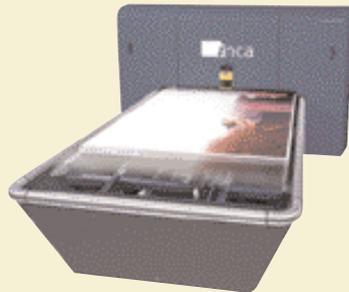
**Service:** Is the service local to you? If not, how far away are they and what is the policy for repairs both in and out of warranty?

# The World of Flat

I looked at several UV-curable flatbeds from different manufacturers in my investigation. Each machine has advantages and drawbacks. These are the printers I looked at:



**Durst-Rho 160**



**Inca Digital — Eagle-44**



**Scitex — Veejet**



**NUR — Tempo**



**Zund — UVjet 215-C**



**VUTEk — PressVu UV 180/600**



**3M — Scotchprint 2500UV**

I also considered some flatbed printers that do not use UV-curable systems. These include:

- Encad — NovaJet 880**  
(pigment-based inks)
- Mimaki — JF-1218**  
(pigment-based inks)
- Oce — Arizona T220**  
(solvent-based inks)
- Roland — FlatJet**  
(in development;  
pigment-based inks)

have the Durst Lambda that will produce 1 foot per minute (2 FPM for the newer ones) so in one hour I can have about 25 30" x 40" prints on a roll. To process these prints I need to laminate them, cut the boards, mount them, and trim the excess and pack them. In my shop I will assign two of my best for laminating and mounting this job of 25 30" x 40" prints on Sintra. While one guy cuts the Sintra with the Safety Speed Panel saw (10 minutes), the other one will laminate the printers on a Seal 5500 (10 minutes). So 10 minutes later I have 25 boards, and 25 prints with laminate on top and adhesive on the bottom. Now these two will clean the boards, tack the edge of the print to the board using the light table, and then mount them to the Sintra. Once mounted they will take them back to the table and trim off the excess print from the edges of the board. Total time to produce these 25 mounted prints is 2.5 hours (including printing).

As you can see, in a few hours we can get a number of beautiful prints that should sell for around \$3,200 for the whole order. This is as fast as it gets, so if you can run at this speed, great!

When it comes to the flatbed printers the speed is not as relative to this example because if you have a full system with a cutter the machines do all the work. This same job on a 600 dpi flatbed printer with an I-Cut would take approx. 1 1/2 hours and for most jobs you would have a hard time telling them apart!

## **COST TO OWN/RUN A FLATBED**

I think these printers are free! But I do not think that most businesses could say this until these printers are under \$50,000. Let's look at the features and numbers to see if we can move forward on a flatbed printer.

1. It is true that you only need one operator to run a complete flatbed system. The basic system would be a flatbed printer (like the new Mimaki or Oce) and the boards would be cut by the conventional methods. The high-end system would be a full feed printer with a computer run cutter. The full system with the cutter can be justified because the printer does the work of the printer, laminator and the mounter. If you look

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at the cost of a laminator (\$10-20,000), and the cost of an inkjet printer that prints outdoor ink (\$35,000) and the cost of adhesive backed vinyl (\$1.00 per square foot), and the cost of an operator to finish the printers (\$30,000 per year), in the first year you can expect to pay out about \$90,000 for the above system.

The second year is \$50,000 (operator and vinyl). After three years you have paid out over \$190,000 in equipment and labor — labor being the largest part at \$90,000. With a flatbed printer you do not need the laminator or the operator, and most of all the adhesive backed vinyl.

2. The next major part is the ability to put ink on just about any surface. Take Sign Foam, and hand carve some great sign. As long as the carving is not too deep, you can now load this Sign Foam into the flatbed and print on it! Now load in your favorite wood type, print on it, now carve it, and coat it. Now go out back and find anything to print on and soon your creative juices are flowing!

3. The next major addition to the flatbed market is white! Yes, white! If you can print white, you can print on just about anything — even black walnut.

Since the SGIA show in the fall of 2003, I have been made aware of two more flatbed printers that will be released in the next few months. I believe that over the next 12 to 18 months you will be able to purchase a flatbed for under \$100,000.

Nothing is what it seems until you get into it, but I believe that this new technology is the future and if I could start over today I would purchase one flatbed 600 dpi printer with an I-CUT system, and a large sales staff. The rest would be history! The truth is that that last few years have been very tough on a lot of us and every day someone is trying to sell us something that looks better on the surface, but I believe this new way of printing will open doors that you did not know existed!

Run the numbers and when you are all done, cut them in half. Then look at the bottom line. This number is your pre-approval number so you will know how much you can spend on a new flatbed printer.

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