

Silicon Image iScan Ultra Video Processor



In the spring of 1999, a little company called DVDO introduced an \$899 line-doubler, the iScan Plus. It was barebones on features, but its image quality challenged even the expensive Faroudja boxes available at the time. A year later, DVDO was acquired by Silicon Image and the iScan V2 was introduced. A third-generation model, the iScan Pro, added component (YPbPr) inputs, extracting the highest possible color resolution from a DVD player. In the fall of 2002 Silicon Image introduced its fourth-generation model, the iScan Ultra. It uses SI's latest de-interlacer chip, the SiI-504.

When I received the iScan Ultra for review, my first thought was, "Does the world really need another line-doubler?" But after installing the unit in my home-theater system I realized why Silicon Image calls this a video processor rather than simply a line-doubler. It is not just its PR department injecting steroids into the name. The iScan Ultra does many things besides line-doubling or, more properly, de-interlacing, and it does them very well.

What Is Line-Doubling, Anyway?

Although many people have heard the term line-doubling, also called progressive scan and de-interlacing, the process is still misunderstood and con-

fusing. The NTSC TV system uses a special form of analog compression: Half the picture is sent in 1/60th of a second, followed by the other half of the picture in the next 1/60th of a second, the two sets of lines *interlacing* between each other to create a 480-line interlaced picture (480i). This system worked fine for the small TVs of yesteryear, but as home theaters began to appear in the '80s with larger and larger TV screens, the motion artifacts of interlacing became more obvious. The "progressive-scan" solution that emerged captured the odd and even lines in a frame buffer, then displayed an entire 480-line image every 1/30th of a second (480p). Because the number of lines displayed each 1/60th of a second had doubled from 240 (half the picture) to 480 (the whole enchilada), devices that performed these functions were commonly called *line-doublers*. The combining process (de-interlacing) does *not* increase resolution, but because the image is presented to the eye twice as often the picture looks smoother, freer of interlace flicker, and more pleasing. To further rid film-based images of artifacts, the more sophisticated video processors recognized the 3-2 pulldown sequencing required to display 24fps (frame-per-second) film sources at NTSC's (approximate) 30fps, and corrected the artifacts that result from that process. The iScan Ultra does all this and more.

What Else Does It Do?

Although Silicon Image de-interlacer chips are used in several high-end DVD players (Denon, Ayre, Camelot), these players lack the added features of the iScan Ultra. The iScan Ultra is a thin wide box that can be rack-mounted. Silicon Image adds a remote control that duplicates all the features of the front panel, save the ability to lock the video adjustments of each input. The Ultra has two inputs each for composite, component (YpbPr), and S-video. This is more than enough for the average home theater. If you have an HDTV satellite receiver or cable STB (set-top box), the iScan Ultra has a 15-pin D-Sub HDTV "pass-through" connector. There are only two output connectors, a 15-pin D-Sub for analog signals and a DVI (Digital Visual Interface) for digital signals. *[High quality "break-out" cables with 15-pin D-Sub at one end and component, or RGBHV, at the other are available at reasonable cost from many cable manufacturers, including BetterCables.com on the Internet—Ed.]*

Not many display devices use DVI connectors yet, but they are the wave of the future. When most enthusiasts think of a DVI connection they think of HDTV signals, but this is not the case for the iScan Ultra. HD signals are pass-through-only—the DVI output does not function in the pass-through mode. The DVI outputs only

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480p signals processed from analog 480i input signals. Since the internal processing of the iScan Ultra is done in the digital domain, going directly to a DVI digital output avoids extra D-A and A-D conversions, *if your display is digital and accepts DVI inputs*.

The analog output can be designated as either RGB or YPbPr (component). For RGB there are three sync options: HV, composite, or sync on green. A problem with the analog outputs is that when you select YPbPr output, a signal still remains on the sync lines. Projectors like my NEC LT-150z detect these sync signals and switch to RGB, resulting in a green image. This problem caused me and several other early adopters some dismay, but most dealers should by now be aware of the problem and its solutions. (I used a 15-pin-D-Sub-to-RGBHV break-out cable and disconnected the HV wires at the projector end.)

A major advantage of using the Ultra for video switching is that each input has its own independent video adjustments, including aspect ratio, brightness, contrast, saturation, hue, sharpness, and a feature called “chroma filter” that allows you to tweak each input to match the other inputs. (Chroma filter also compensates for the so-called “chroma bug” found in many DVD players. Although my Sony DVP-S9000ES DVD player is reported to have this bug, it just isn’t significant enough to bother me so I didn’t use this feature. [See *Technical Forum this issue—Ed.*]) Other adjustments include “Y/C delay” to compensate for lag between the luminance (Y) and chrominance (C) of a video signal, which causes color smearing. (There is a test signal to adjust this on the AVIA disc.)

I found the iScan Ultra’s two independent adjustments for “sharpness”

extremely valuable. The first is EDGE ENHANCEMENT, which uses sixteen fine steps to add or remove edge sharpness, increasing or decreasing the “halo effect” around objects on many DVDs. The second adjustment, called FINE DETAIL (not available with DVI output), improves the visibility of small details but may increase video noise. Tweaking up the FINE DETAIL control restored some of the apparent lost detail without generating the halos. I can’t emphasize enough how unusual it is to find such a sophisticated sharpness control on a product at this price point. I absolutely detest edge enhancement in video images, and the iScan Ultra let me tame my worst DVDs.

Another adjustment I loved was ASPECT RATIO. It lets you display a 4:3 image in the center of the 16:9 screen with a choice of sidebar colors (black, dark gray, medium gray, or light gray). Many displays, my NEC LT-150z pro-



jector included, don't offer this feature. [As a reader pointed out recently in a letter, some early HDTVs lock into 16:9 mode when a progressive signal is present. The iScan Ultra's aspect-ratio control is a solid work-around solution—Ed.] Those with widescreen displays can zoom in on 4:3 letterboxed images with the LBX setting until it fills the 16:9 screen. I found this useful for watching letterboxed laserdiscs as well as the occasional letterboxed TV show, such as a Sci-Fi Channel marathon of *Stargate SG-1*. (My projector has a similar feature, but it is buried three menus deep. The iScan Ultra's top-level adjustment was much more user-friendly.) More manufacturers should take note of how Silicon Image has implemented aspect-ratio control in the iScan Ultra.

Incidentally, as I videotaped the Spielberg miniseries *Taken* (also shown in 4:3 letterbox and watched with the LBX feature on), I uncovered yet another feature of the iScan Ultra: its time-base corrector. This circuitry corrects the jittery image you often see from videotapes. The Ultra converted a videotape that wouldn't have been watchable on my projector into almost a thing of beauty.


Performance: How Does it Look?

The iScan Ultra is, at its heart, a de-interlacer. I used it over a period of weeks with a Sony DVP-S7000 DVD player and a Sony DVP-S9000ES DVD player in 480i mode. In the former case, I compared the iScan to a Faroudja DVP-3000 processor; in the latter, I compared it to the same DVD player in 480p mode. I ran through a series of DVD movies with tough de-interlacing test scenes, as well as several test discs. Since de-interlacing has to be done differently when the source is video rather than film, I used some test scenes for

both video and film to test how well the Ultra handles transitions between the two. The iScan Ultra did slightly soften the image compared to the Sony 9000 (confirmed with AVIA's 6.75MHz test pattern). In general, most current DVD players will do a fine job of de-interlacing and since they do it internally, in the digital domain, there is neither loss of resolution nor addition of noise due to the extra D/A and A/D video conversions required when using an external processor like the iScan Ultra. In spite of this, I found that the many functional controls of the iScan, especially the fine sharpness adjustments and the handling of 4:3 images, outweighed the slightly better resolution of the Sony 9000's internal de-interlacer. I also preferred the iScan over the far more expensive Faroudja DVP-3000 video processor (which is my system reference) for these same reasons, with but one exception. The Faroudja scales images to resolutions higher than 480p and the iScan does not.

For CRT front projectors it is important to find a scan rate where the scan lines touch but do not overlap, e.g. 600p, 720p, 800p, or 960p. For fixed-pixel displays (LCD, DLP, plasma etc.), scalars match the native resolution of the device (1280x720, 800x600, etc.). My NEC LT-150z uses a Texas Instruments 4:3 DLP chip with a 1024x768 pixel array. The NEC has good internal scaling, but the internal de-interlacer in the NEC projector is terrible. If I feed it a 480i signal from my Sony DVD player, or from other sources like VCRs and set-top cable/DSS boxes, the de-interlacing artifacts are unbearable. Using the iScan Ultra with my NEC projector, there were no de-interlace artifacts and the scaling artifacts of upconversion from 480p were not objectionable. Although the iScan Ultra's de-interlacing will always be a benefit, some displays *will* require superior scaling capability for the best picture.

Summary

If all you watch are DVD movies, then you probably don't need an image processor like the iScan Ultra. There are many modestly priced DVD players that do a fine job of de-interlacing. As noted, a separate de-interlacer usually can't compete with a progressive-scan player because of the additional D/A and A/D conversions. But the de-interlacers included in some rear-projection TVs and front projectors are often not very good. If you watch numerous sources, the iScan Ultra should be high on your to-buy list. It offers switching, video adjustments, controls, and a 480p output in two forms of analog (RGB, component) and DVI. It also mates well with smaller fixed-pixel front projectors having displays that are 1024x768 or less. Its only drawback is that it doesn't offer scaling for different types of fixed-pixel displays or CRT front projectors (for this you should look to iScan's competition like Focus Enhancements). If I didn't already have a Faroudja, I would give the iScan serious consideration for my home theater. 

SPECIFICATIONS

Inputs: Two YPbPr component video, two each composite and S-video, one pass-through on 15-pin D-Sub
 Outputs: One RGB/YPbPr on 15-pin D-Sub, one DVI
 Dimensions: 17" x 2.2" x 10.4"
 Weight: 12.9 lbs.
 Warranty: One Year

MANUFACTURER INFORMATION

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 Price: \$1199

