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Fujitsu PDS5002 50" Plasma Monitor



When it comes to product reviews, timing is everything. No sooner had I finished my plasma roundup for Issue 39 of *The Perfect Vision* than Fujitsu announced it would begin shipping its new 50" consumer offering, the PDS5002. First seen at Winter CES, this panel got a lot of folks excited simply because Fujitsu was taking a more serious look at big-screen "HD" plasma, as opposed to just selling its 42" 1024x1024-pixel models.

I received a review sample of the PDS5002 in early October, and put it through the same battery of tests as my earlier plasma round-up participants. I can tell you that this particular model was worth the wait—its performance is very, very good for a PDP monitor, although not significantly better than Panasonic's PT-50PD3 and Pioneer's PRO-1000HD. But it is better, and that improved performance can be quantified.

Out of the Box

For the most part, plasma panels all look alike. That's because there is

so much private-labeling going on, with companies like Sony, JVC, and RCA purchasing panels from Fujitsu and NEC. While the PDS5002 uses a plasma glass matrix manufactured by Matsushita, the driving electronics are 100% Fujitsu, particularly a circuit A, or Advanced Video

asma monitors may look "cool" with progressive-scan RGB signals, but their performance to date with scaling and de-interlacing video has ranged from awful to mediocre. Supposedly, AVM was developed to clean up video signal-processing artifacts. How well does it work? Read on.

The connector complement on the PDS5002 is pretty sparse, but not too sparse. You get one composite BNC input and one DIN S-video jack, plus a pair of analog component jacks—one with 5 BNCs for either sync-on-green or RGBS/RGBHV, and one with a 15-pin D-sub jack common to computers. Want more? There's also a DVI input for direct digital connections. (No RCA video jacks on this baby!) This means you can hook up both to a component DVD YCbCr and DTV YPbPr source, plus one RGB computer input. Or, you could feed DTV through the 5002's 15-pin jack as RGB, and free up the 5 BNC jacks for your DVD player. If your computer has a DVI video card (not many do, but they are out there), then you can permanently hook up a DVD player, DTV set-top box, and a PC (through the DVI connection), avoiding the use of an outboard switcher.

The Fujitsu PDS5002 is devoid of

any audio inputs or outputs. That means you'll need to use a separate audio reinforcement system with this panel, as it has no onboard audio amplifiers such as those provided inside the PT-50PD3 and PRO-1000HD. I have already heard some "static" from plasma enthusiasts who feel Fujitsu sold them short by leaving out audio connectivity.

Is this a big problem? My thinking is if the PDS5002 is the centerpiece of your home theater, you'll probably be using it with a separate audio system anyway. From the looks of things, manufacturers are more inclined to offer accessory speakers for smaller plasma monitors (32" to 42") because these models are destined to be our next general-purpose TV sets. A 50" panel is a little large for the average family room and bedroom, and is certainly not a "general purpose TV."

Remotes and Menus

Setting up the PDS5002 is not a complicated process, but Fujitsu still uses a rather primitive-looking menu display with lots of layers. You'll need to scroll across or down each menu bar to the desired setting, hit the ENTER key to select the parameter to be adjusted, make the adjustment, and hit ENTER again for the adjustment to be saved.

That's a lot of work, in my opinion. On most display products I've tested, simply scrolling into a menu adjustment and making that adjustment is sufficient to save it. Why would I go to all the trouble otherwise? (Subtle jab at Fujitsu, there.) It took me awhile to get used to hitting ENTER the second time and saving my work, especially after calibrating RGB drive levels.

You'll have lots of settings to play

Fujitsu's PDS4242 Plasma Monitor

Fujitsu's latest 42" plasma panel, the PDS4242, is a next-generation evolution of the Fujitsu 4222 reviewed in *The Perfect Vision* Issue 38. It deploys the same AVM (advanced video motion) processing technology used in its somewhat larger cousin, the 50" PDS5002. As Pete Putman points out, even at this relatively early stage, plasma image quality can be outstanding, and will undoubtedly get better. The 4242 has blacker blacks, whiter whites, and most importantly, grayer grays—free from any obvious coloration or mottling. Color transitions are exceptionally smooth and realistic, without visible artifacts. The many advantages of these flat-panel displays (such as high brightness, perfect geometry and convergence, DVI interface, etc.) make them increasingly compelling contenders for the home-entertainment dollar.

Both the PDS4242 and PDS5002 panels have approximately the same number of pixels, but those in the 4242 are arranged in a 1024x1024 matrix with a 16:9 aspect ratio. This format is exceptionally well suited for HDTV, especially the 1080i variety, which is the dominant format used by terrestrial, cable, and satellite broadcasters. The 4242 simply lops off a few lines top and bottom, and 1080i fits perfectly onto the panel, without vertical scaling. A 720p source looks very good too, judging by the HD broadcast of ABC's *NYPD Blue* that I played back from my hard drive. By the way, all HDTV broadcasts are not created equal. For example, low-budget, first-season shows such as *Alias* are rather murky, while a program such as *NYPD Blue*, with its huge following, has accurate colors, broad dynamic range, and high photographic clarity despite the hurky-jerky camera work. Reports are that NBC's *Tonight Show* with Jay Leno is a sight to behold.

Regarding motion artifacts, let's face it, 60 "samples" per second is simply inadequate for a satisfactory rendering of moving objects. AVM uses image processing techniques to display a total of four sub-fields per field-interval, instead of the usual single field, not only improving the portrayal of motion, but also, according to David Fink of Fujitsu, increasing peak brightness without shortening panel life. Fujitsu now provides a three-year warranty, appropriate and appreciated for products at this price level, with an expected life-to-half-brightness of 30,000 hours (that's fourteen years at six hours a day).

The PDS4242 strobes each of its two alternating 1024x512 pixel fields over 100 times in each field-interval. This technique seems to produce higher subjective brightness levels, because the entire field is zapped all at once, and the last of the four sub-fields is "hit" more frequently, making it brighter than the preceding three. This field also has significantly increased dynamic range for much better shadow detail. For situations where it's hard to reduce ambient lighting, the PDS4242 is especially suitable, and is actually capable of considerably higher brightness than the PDS5002. This figures, because a larger screen requires more energy per pixel to get the same level of brightness, and there are limits to how much energy a given pixel can emit without drastically reducing its functional lifespan.

Like Pete, I also would like to see a slicker, and less button-push-intensive user interface (watching TV is not supposed to involve work or thinking). Given the vagaries in HDTV and DVD mastering, it's often necessary to touch up the black level a bit or adjust the white level for optimal viewing. However, the new gamma controls are a big help.

In addition to the usual video connectors, the back panel sports a DVI interface. Those with advanced computer video cards already know what a major step forward this is. Replacing high-bandwidth analog signals with, essentially, a digital link does a lot to sharpen up the picture. As DVI becomes commonplace, this direct connection from sources (DVD player, HDTV decoder, etc.) to a monitor with built-in high-quality scaling and motion processing will reduce cost while improving picture quality and ease of use.

The PDS4242 has sturdy integral carrying handles, reducing the possibility of unfortunate accidents. Also, the panel's overall noise level is much lower than that of the previous PDS 4222 model, perhaps because the number of microprocessor-controlled fans has been reduced to three. Listing at \$9999, the PDS4242 is certainly expensive, but it represents a big step up in performance at this price point.

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with. In addition to the normal image adjustments, you can also select one of four gamma tables, and you can adjust and save brightness, contrast, and white balance in any of them. Three pre-programmed color temperature settings are provided—WARM, STANDARD, and COOL—plus a setting for USER, which allows you access to red, green, and blue drive (not bias).

Want to play around with aspect ratios? In video mode with 480i sources, you can select NORMAL (4:3 image), AUTO (detects the signal and sync format and sizes the image automatically), WIDE 1 (stretches a normal 4:3 image horizontally), WIDE 2 (expands an anamorphically-squeezed image horizontally), ZOOM 1 (enlarges a letterboxed video image on a 4:3 screen to fill the 16:9 display), or ZOOM 2 (does the same thing, but leaves room for captioning).

In RGB mode, not all of these options are available. But, you can still select NORMAL (4:3 RGB source shows normally), WIDE (stretches 4:3 image to fill width of the screen, which is useful with RGB-output video scalers) and ZOOM (enlarges the 4:3 image and crops in on it). Feeding a 720p or 1080i HDTV signal into the PDS5002 forces it into WIDE mode, although you can also use ZOOM. In this case, the WIDE image is always the correct 16:9 ratio to choose.

There is also a white screen mode, plus an "exhibition" mode which boosts brightness by about 15% in the low gray areas, but doesn't do anything at all to high grays and white. Depending on which gamma setting you choose, you can also boost brightness by over 25%. Four noise reduction modes round out the picture—MINIMUM, STANDARD, MAXIMUM, and OFF. I didn't see much difference with any of 'em when looking at component DVD or DTV signals, so I left the setting at MINIMUM.

Fujitsu's remote controls remain among my favorites—they have a minimal button complement, and the buttons are just the right size for my fingers. (If you can use a remote control with your eyes closed, or with the

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remote behind your back, it's gotta be a good design!)

These buttons include VIDEO INPUT (repeatedly hitting it cycles through composite, S-video, and component sources) and RGB INPUT (cycling through the 5xBNC jacks, the 15-pin connector, and the DVI input). The SCREEN FORMAT button is also parked on the remote, and tapping it cycles through all of the available screen formats for a particular video/RGB signal.

In the center of the remote, you'll find the MENU bar and a four-way directional cursor. The ENTER key is below the cursor buttons. To the right are two buttons marked "+" and "-" that the manual says are for "Volume Adjustment (unused)." If so, why leave them on the remote? (Or, why not enable another function through these buttons?) Four additional buttons can be used to control multiple 5002s from the same remote, but chances are you

won't ever touch these keys.

Calibration and Performance

When I set about calibrating the PDS5002, I naturally loaded up the standard Fujitsu look-up tables for my FSR color analyzer. Wrong! I forgot (once again) that the phosphors were Panasonic, so I had to re-load the correct table and recalibrate red, green, and blue drive. Since the panel wouldn't let me get at the bias settings, I calibrated it for best white balance at about 30 to 40% gray, and not 100% white.

I used GAMMA Setting 4 and the USER color temperature menu selections for the calibration process. As a reference, I fed the same set-up signals to my Princeton AF3.0HD monitor for some real-time feedback through my eyes (your eyes can adjust to various tints of gray very quickly without an

accurate gray reference handy).

Once calibrated for best color temperature, the PDS5002 tracked grays quite well, varying from 6550K by no more than +160° (6710K at 100% white) and no less than -450° (6100K at 100% black). This panel incorporates an AGC circuit to prevent overdriving it in full white mode, so to get an accurate measurement of brightness with high gray levels, you'll need to let the panel "settle" a bit. In 16:9 mode, I logged 76 nits, while switching to a 4:3 image resulted in a reading of 87.7 nits.

Contrast readings were quite impressive on this panel, but that's no surprise with its Panasonic lineage. After setting up PLUGE and grayscale patterns, ANSI (average) contrast was measured at 567:1 in 16:9 mode and 680:1 in 4:3 mode. Peak contrast measurements were also impressive, producing readings of 589:1 with a 16:9 screen and 707:1 with a 4:3 screen.

Of course, high brightness and contrast mean nothing without good grayscale reproduction and here is where the PDS5002 really shines. Using a 256-level grayscale ramp, I checked for false contours (abrupt transitions from one level of gray to another) and color shifting or banding. I couldn't find any, save for a possible slight band from .4 to .2 (absolute black)—and even that transition measured being "smooth" with the F color analyzer.

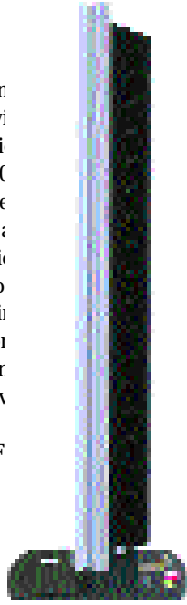
Fujitsu's AVM circuit is a new method to modulate low levels of gray that resembles chaser lights on a theater marquee. Here's how it works: AVM breaks down each field of interlaced video (about 1/60th of a second) into four sub-fields with differently-weighted time intervals, and processes them accordingly. The difference is evident with low grays and black-to-gray transitions, which are very smooth.

If you look through a magnifying loupe, you can see this chaser-like cycling of pixels quite clearly in all levels of gray. While it happens in alternating rows of pixels, it's not at all like the ALiS interlaced scanning system used on Fujitsu's earlier 1024x1024 panels. Step back a few feet from the panel, and you don't notice the effect anymore—just nice, solid blacks and low grays.

Video Quality

The trick to viewing a panel this large is to pick a reasonable viewing distance, which in my case was eight to nine feet. At this distance, there was no visible picture structure and widescreen DVD and HDTV images were smooth. Using a Panasonic TU-HDS20 set-top box, I spent several nights watching selected HDTV programs including *Alias*, *CSI*, *Crossing Jordan*, and *The Education of Max Bickford* on the PDS5002.

I tested a variety of DVDs to check again for motion and scaling artifacts, including *Fifth Element*, *Apollo 13*, *Fantasia 2000*, and *Austin Powers 2*. I



also pumped in ordinary, garden-variety cable-TV NTSC signals, and can tell you that video quality with any source was excellent. Even the cable signals had no more visible artifacts than I saw on my Princeton AF3.0HD direct-view monitor.

Here's why: In addition to the AVM processor, the PDS5002 also incorporates Moving Vector Correction Circuitry (MVCC). This technology creates "bridging" or "in-between" sub-fields of video to smooth out motion sequences and eliminate interlacing artifacts such as "jaggies." It works in much the same way as a de-interlacing signal processor.

MVCC certainly works well! For comparison, I connected a Faroudja Native Rate Scaler (set to 1280x768 RGB output) to the PDS5002 and switched back and forth between the NRS' output and a direct component input from my Sony DVP-S7000 DVD player.

I gave up after half an hour—there was no apparent difference in video quality. (A direct-view CRT should look this good.) Frankly, I'd much prefer viewing this panel—and the Panasonic PT-50PD3 and Pioneer PRO-1000HD—than a comparable rear-projection TV using 7" tubes. The image is just sharper and more pleasing to the eye.

The only true plasma artifact I saw was during video scenes that faded to black, or up from black. Because of the way AVM works, these transitions appear to have a slight "sparkle" to them just as the scene fades out. Other than that, if you choose the correct gamma setting (DYNAMIC 4 works well for video) and set up your brightness and contrast carefully, you will see a very CRT-like response on the PDS5002.

Conclusions


With the PDS5002, Fujitsu jumps to the head of the 50" class over Pioneer and Panasonic. It's not a huge jump—more like changing places in

SPECIFICATIONS

Technology: Gas-plasma display panel
 Resolution: 1366 x 768 pixels
 Aspect ratio: 16:9
 Number and type of inputs: One BNC composite, one DIN S-video, one BNC component YCbCr or RGBHV, one DVI-D RGB, one 15-pin VGA RGB
 Dimensions: 47.7" x 28.6" x 3.9"
 Weight: 99.2 lbs.

line. But you can see and measure the slight differences among the three panels. Imagine that someone combined the deep black levels and high contrast of the PT-50PD3 with the smooth, clean grayscales of the PRO-1000HD, and you've got the PDS5002.

What does this mean in the long term? Look for a bunch of manufacturers to private-label this 50" plasma monitor real soon (Runco would be a likely candidate) for the home-theater market. Also, the fact that Fujitsu can get this level of scaling and grayscale performance out of a plasma panel means PDPs are indeed serious contenders to replace cathode-ray tubes in direct-view TV sets. In fact, they could (and probably will) push many rear-projection TVs off the market, once the prices of PDPs come down enough. Put the PDS5002 side-by-side with one of the current 1280x720 single-chip DLP RPTVs, and it's no contest—480i source scaling is better, color quality is better, and the PDS5002 takes up less room on top of all that.

To put things in perspective, the price of this panel (\$14,999 MSRP) is still a bit steep for the average big-screen TV fan. While that price is in the same ballpark as the aforementioned DLP sets, it's about double that of some really top-notch tube RPTVs. But if you've simply got to have a 50" plasma panel and cost is not an issue, the PDS5002 is the way to go for now. 

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