Elation Design Spot 1200C

By Mike Wood

Figure 1 - Unit as tested.

It seems like I've been looking at LEDs a lot recently. While LEDs grab all the green headlines, we shouldn't forget there's still a solid base of automated lights out there using discharge lamp technology that, in many, cases are just as energy-efficient as LEDs, if not more so. Of course, many manufacturers make both kinds of product; the company we are looking at in this review is one of those. Elation is a well-known manufacturer, which has moved upmarket from its beginnings as a club-gear supplier to products aimed at every sector of the market place. So let's step back from solid-state lighting briefly and take a look at one of Elation's latest "conventional" moving lights: the Design Spot 1200C. (Isn't it odd that "conventional" used to mean a non-automated light but now is increasingly used to refer to any light source that isn't solid-state?)

As its name suggests, the Design Spot 1200C (Figure 1) is a spot automated light using a 1,200W lamp and providing a good range of features, making it comparable with many other fixtures on the market—but how does it perform in practice? As usual, the review will lead us from the lamp to the final output lens, providing as many actual measurements as I can to allow you to make your own informed decision. The data presented here is based on readings that I take when testing a single unit supplied to me by the manufacturer. I trust that the unit supplied is typical and representative of the product; however, it is likely that production units will vary slightly.

Starting with the power input, the Design Spot 1200C is rated for operation at various voltages ranging between 208V to 240V at 50 or 60Hz. There are no instructions in the manual as to how to change these settings, so I assume it is not user-selectable. The unit supplied and tested was a 208V, 60Hz unit designed for operation in the U.S. across two phases. Elsewhere in the world, the other available voltages are normal single-phase voltages.

Lamp

The Design Spot 1200C uses the Philips MSR 1200/2 SA/DE double-ended lamp. (The manual incorrectly states that it uses a 1200 FastFit lamp; however, Elation tells me this is being corrected.) This is a double-ended version of the more familiar single-ended MSR short-arc lamps, and has a good track record. Access to the lamp (Fig. 2) is through four captive screws and a drop-down rear plate (Fig. 3), which also provides the lamp-adjustment screws. As can be seen in Figure 2, the lamp change is very easy—release the two spring clips and snap a new lamp into place. Figure 4 shows a view of the entire assembly and lamp house, including the rear of the glass, cold-mirror-coated, faceted

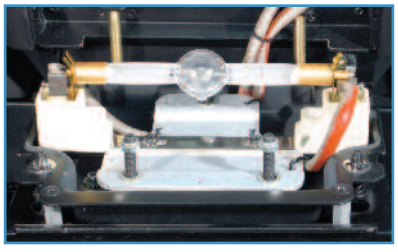

Figure 2 - Lamp.

Figure 3 - Lamp Plate.

reflector. You can also see that Elation has applied reflective aluminum to the inside of the lamp house metalwork to minimize local heating from light escaping through the large cut-out in the reflector. As is common in automated light design these days, the lamp house is maintained as a sealed compartment with its own cooling fans, keeping as much heat as possible out of the downstream optical train and electronics. I examined the lamp both before and after testing, and saw no signs of overheating or poor cooling. Capping the output of the lamp house is a hot mirror, reflecting heat back and keeping it out of the optical train. This can be seen in the view through the reflector shown in Figure 5. Lamp power is supplied from an electronic ballast, mounted in the top box, and a high-voltage ignitor in one of the yoke arms.

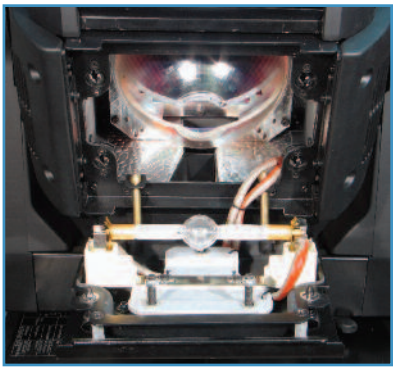

Figure 4 - Lamp house.

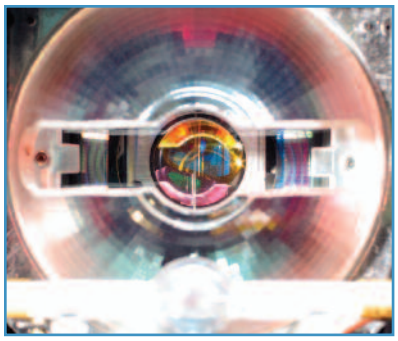

Figure 5 - Reflector.

Color mixing

Next in the optical train, after the hot mirror, is the color-mixing system. This uses four pairs (cyan, magenta, yellow, and CTO) of transverse-etched dichroic filters that move in linear fashion across the aperture on tracks, like pairs of curtains. Each filter is rectangular in profile, but has an etched "fingers" pattern to provide variable density of the filter. The fingers are offset from each other on opposite sides so that the system avoids moiré or interference aberrations. Figure 6 shows the slightly

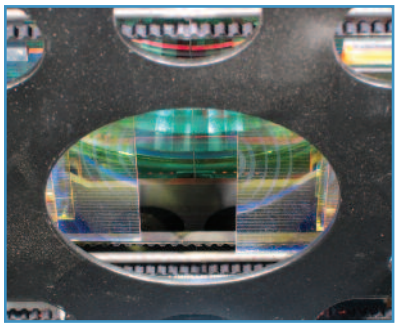

Figure 6 - Color mix.

unusual etched pattern with the addition of some circumferential arcs, as well as the fingers. Presumably, this aids the smoothness of the mixing. For me, the color mixing is one of the highlights of the Design Spot 1200C. Elation has done an excellent job here; the colors were uniform and smooth over just about the whole range. If I'm being very critical; I could just see a little visible color banding when mixing a couple of pastel colors, but absolutely nothing that would be a problem. This is particularly impressive, as Elation uses

Color Mixing							
Color	**Cyan**	**Magenta**	**Yellow**	**Red**	**Green**	**Blue**	**CTO**
Transmission	28%	3.7%	69%	3.0%	11%	0.3%	37%
Color change speed – worst case				0.5 sec			

very saturated dichroics in its flags to facilitate mixing some very deep colors—that choice often makes pastels tough to mix evenly.

As we have seen with previous Elation luminaires, the blues in particular are very deep (and thus fairly low output at 0.3%) and can almost be used as a Congo Blue; the same applies to red, where the low output of the MSR lamp compounds the issues and results in a red that leans towards amber. All manufacturers suffer from this problem—they want the punchy output and lack of "red ring" that a high-color-temperature discharge lamp can give, but that inevitably results in lower performance in the reds. An awful lot of engineering and product development involves balancing this kind of compromise to get a result that works well and is acceptable to the end user.

Dimmer and strobe

Next in line is the dimmer/shutter system. This uses a pair of linked sawtooth-edged flags to provide full field dimming and strobing. Dimming is good down to about 10%, but gets very steppy, with a lot of visible artifacts in the beam below that down to blackout. The dimmer curve from this system is a somewhat unusual shape (Fig. 7). Very little happens in the flat top portion until you get down to about 50%; then it's a good straight line down to 10%, when we get into the steppy region mentioned above. The flat top to this curve means that effectively we lose half the resolution of the dimming system. On the positive side, Elation does offer a 16-bit control mode option for dimming, which would help a lot with both the loss of resolution and the low-end steppiness.

The same system also provides the strobe function, thus running pretty quickly for what are fairly large flags with a measured range from 1.65Hz up to 11Hz.

Color wheel

Sandwiching the shutter system on

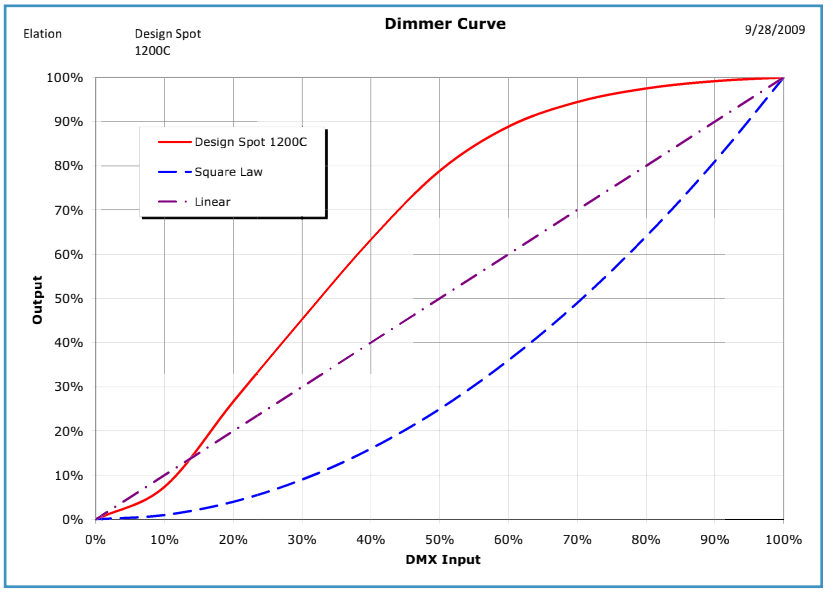

Figure 7 - Dimmer curve.

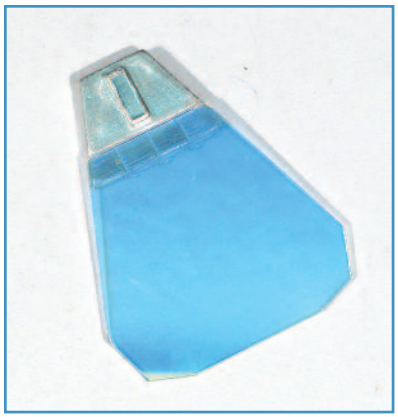

Figure 8 - Color.

the other side is the fixed color wheel, with eight interchangeable trapezoidal colors (Fig. 8). The dichroic wedges are attached to aluminum clips, which snap into receptacles on the wheel. I found them very easy to change.

Fixed Color Wheel								
Color	**Red**	**Blue**	**Green**	**Amber**	**Red**	**Pink**	**Congo/UV**	**CTB**
Transmission	4.2%	19%	21%	51%	15%	30%	0.1%	44%

This wheel provides a good range of static colors to both complement and work with the color-mixing system. Again, there are some very deep saturates with correspondingly low output and, because of the lamp spectrum, the red is very much on the orange side.

The color-change speed was very quick for a 1,200W unit and, in wheel-rotate mode, capable of good half-colors, albeit at a slight angle. The color wheel, like all the wheels in the Design Spot 1200C, uses a quick-path algorithm so that moves are always made in the shortest possible time.

Color Wheel	
Color change speed – adjacent	<0.2 sec
Color change speed – worst case	0.4 sec
Maximum wheel spin speed	0.55 sec/rev = 109 rpm
Minimum wheel spin speed	140 sec/rev = 0.43 rpm

A very positive feature is that rotations and moves were very smooth, even at the slowest speeds.

Animation wheel

Mounted just before the gobo systems is what in the manual is variously called either an animation wheel or fire wheel. Actually, it isn't a wheel at all, but is instead two half wheels. It's a clever system that uses two 180° semi-circular plates—each with its own motor—that can either be rotated together as if they were a single disc, or separated to provide a gap between the plates when you want to get the wheel out of the path. Figures 9 and 10 show what's going on. Figure 9 shows the gate with just one of the semi-circular plates in view on the left, while Figure 10 shows the same gate with the other plate also rotated into position. Once aligned like this, the two plates can be rotated together to act like a single large disk with an off-center axis. The pattern in the plates is a linear break-up that may be added on top of any other patterns and effects to give some motion to the image. When you don't want to use the animation effect any longer, the system separates the two plates again, opening up a gap between them over the gate, and effectively removing it from the path. It's a neat idea, and it worked well.

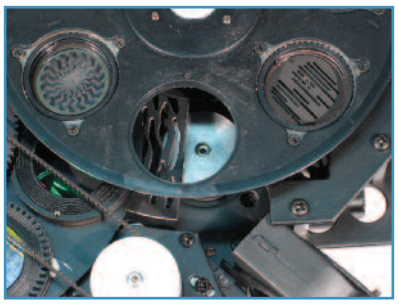

Figure 9 - Animation Wheel 1.

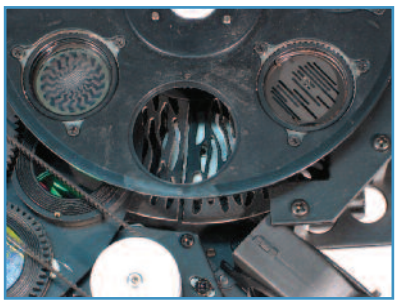

Figure 10 - Animation Wheel 2.

Animation Wheel	
Time to insert into optical path	0.5 sec
Time to remove from optical path	0.9 sec
Maximum wheel spin speed	0.87 sec/rev = 69 rpm
Minimum wheel spin speed	72 sec/rev = 0.83 rpm

Gobos

The Design Spot 1200C has two identical gobo wheels, each fitted with six replaceable rotating/indexing gobos.

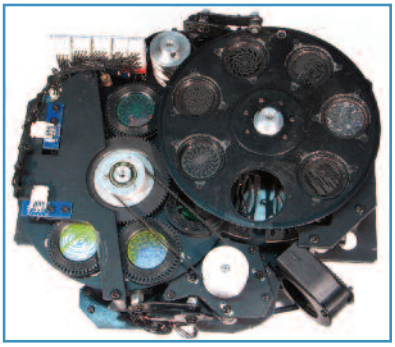

Figure 11 - Gobo module.

Figure 11 shows an overall view of the gobo module when it is removed from the luminaire, where you can clearly see the two adjacent rotating gobo wheels on the front of the assembly, just above the animation wheel system. Gobos are retained in a carrier,

Figure 12 - Gobo.

which also includes the planetary gear for that gobo, and are easily removed by lifting the carrier slightly and pulling out the assembly from the central retaining clip. Figure 12 shows a gobo in its carrier after removal from the wheel. Reassembly is just as easy—slide into position and it clicks into

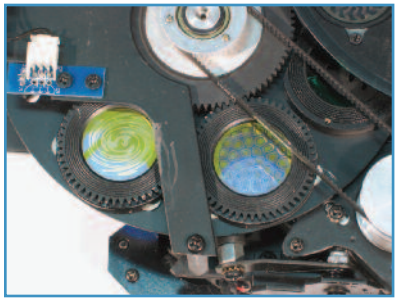

Figure 13 - Gobo change.

place. Figure 13 shows a close-up of the gobos when in position and engaged with the central sun gear.

Rotating Gobos (both wheels the same)	
Gobo change time, adjacent apertures	0.4 sec
Gobo change time, max (Gobo 0 to 3)	0.8 sec
Maximum gobo rotate speed	0.36 sec/rev = 166 rpm
Minimum gobo rotate speed	94 sec/rev = 0.64 rpm
Maximum wheel spin speed	1.7 sec/rev = 35 rpm
Minimum wheel spin speed	64 sec/rev = 0.9 rpm

Gobo positioning and rotation speeds were very good, as was the accuracy of indexing position with a measured hysteresis error of 0.11°, which is about 0.5" at a 20' throw. As mentioned earlier with the color wheel, movement was also very smooth, with almost no visible steps even at the slowest speeds. It is possible to get some morphing effects between the two gobo wheels; however, as with many moving lights, the depth of field of the output lens system is really too short to get both gobos close to sharp focus at the same time.

Iris

The iris is the last item in the image section of the optical train, positioned just before the frost filter and the first output lens. It has a good range, taking the full beam down to 18% of its size when fully closed. This equates to a field angle of 2.9° at minimum zoom and 7.9° at maximum zoom. The time from fully open to fully closed using the normal iris control channel was a fairly slow 0.9 seconds—however, the system is capable of much quicker

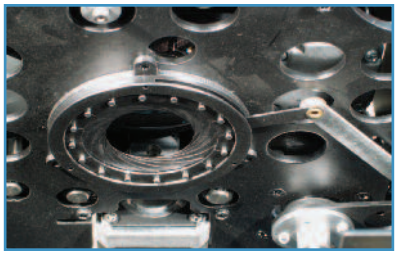

Figure 14 - Iris.

movement; when using the pre-programmed pulse patterns, it opens or closes in less than 0.2 seconds. I'm not sure why Elation doesn't give the user direct access to this fast speed (Fig. 14).

Frost

The frost filter on the Elation Design Spot 1200C is a single frost flag, which is either in or out of the beam—there is no variable control. It can be inserted or removed in about 0.2 seconds and fully diffuses the beam so that gobo patterns are not visible at all. It's a pretty dense filter; output with the frost inserted is reduced to about 35% of its unfrosted level.

Lenses and output

The output lens system used in the Design Spot 1200C is the standard three-group system used in nearly every current automated lighting unit. Two groups move for zoom and focus; the final, stationary, group is the static front lens. The focus quality was very acceptable throughout the zoom range, with no objectionable chromatic or spherical aberrations, the latter of which show up as edge-to-center focus difference. The time for full-range movement of the lenses was 0.7 seconds for zoom and 0.9 seconds for zoom, both of which are very good for this size of unit.

The measured zoom range ran from a minimum field angle of 16° to a maximum of 43.5° (2.7:1) with a total

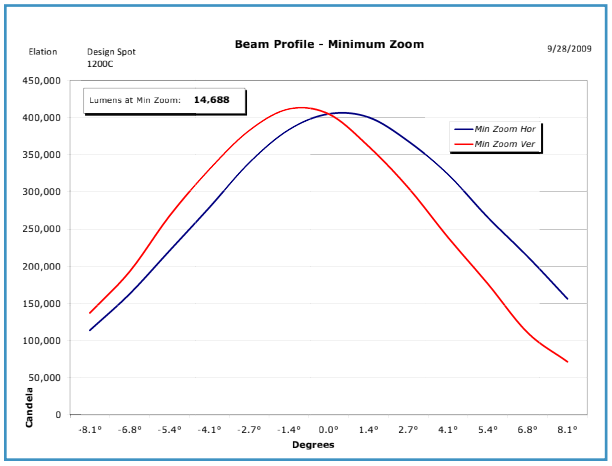

Figure 15 - Beam profile minimum zoom.

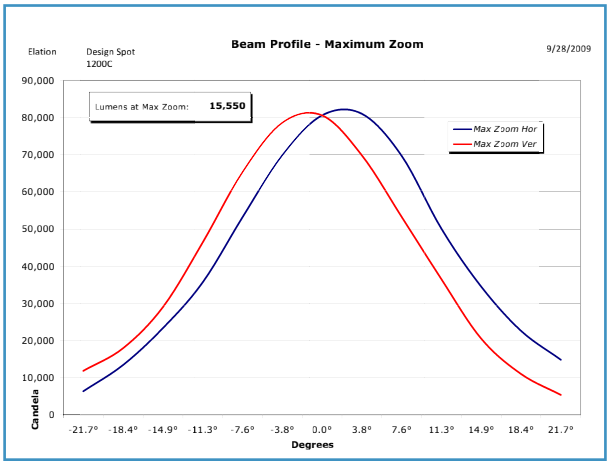

Figure 16 - Beam profile maximum zoom.

lumen output ranging from 14,700 lumens in narrow to 15,500 lumens in wide. I'd say this was about average for this class of fixture—not the highest output on the market, but by no means the lowest either. The output was fairly flat and quite smooth, certainly very usable (Figs. 15 and 16).

Figure 17 - Prisms.

Prism

There are two prisms mounted between the two moving lens groups. Each is placed on its own arm and can be swung into position across the beam, where they engage and are then rotated by a common central gear (Fig. 17). As supplied, the Design Spot 1200C is fitted with a three-facet prism and what Elation call a "3-D" prism, which provides multiple, closely spaced, images in a single direction. It's a difficult effect to describe in words, but it does add depth to many gobo images. The time to insert either prism was around 0.8 seconds and it took 1.8 seconds to swap from one to the other. The rotation speed was variable from 0/8 sec/rev (75rpm) down to 180 sec/rev (0.33rpm).

Pan and tilt

The Design Spot 1200C has a full pan range of 540° and a tilt range of 265°. A full-range pan move was measured at four seconds, while a more typical 180° move took two seconds. For the tilt axis, the corresponding results were 2.5 seconds for the full range, and, again, two seconds for the 180° move.

The measured hysteresis was good at 0.1° for both pan and tilt axes, which equates to about 0.5" at a 20' throw. However, this was somewhat overshadowed by the bounce exhibited by both axes; it's particularly noticeable in pan, at the end of a move. A rapid move was followed by four or five seconds of extensive wobbling before the fixture finally came to rest. The user can mitigate the problem to some extent by using slower moves and controlling the deceleration; however, I'd suggest this is a weak point of the luminaire that Elation may wish to address.

Noise

The noisiest parts of the Design Spot 1200C are definitely the fans. They tend to overshadow any noise from the motors, so many of the figures below look to be the same. I ran the fans in "auto" mode, where the fan speed is temperature-controlled, but, if their noise is a problem, you might want to try out the "low" speed option.

Sound Levels	
Ambient	<35 dBA at 1m
Stationary	56.5 dBA at 1m
Homing/Initialization	57.7 dBA at 1m
Pan	57.5 dBA at 1m
Tilt	57.1 dBA at 1m
Color	56.5 dBA at 1m
Color Mix	56.5 dBA at 1m
Prism	56.5 dBA at 1m
Gobo rotate	56.5 dBA at 1m
Gobo select	56.5 dBA at 1m
Zoom	56.7 dBA at 1m
Focus	56.7 dBA at 1m
Strobe	56.7 dBA at 1m
Anim Wheel	56.7 dBA at 1m

Electronics and control

In common with its siblings, the Design Spot 1200C has a distributed electronics system where motor drivers are mounted in various places within the system. Figure 18 shows a view of the head with the top cover removed; you can see a couple of those boards in close-up in Figure 19. Others are mounted on the other side of the head and in the top box. Most axes are homed silently, using magnetic sensors, and a cold system reset took 37 seconds to complete. The modular construction facilitates complete assemblies to be removed for service and replacement (Figs. 18 and 19). I tried this by removing the gobo module, and found that the ease of removal of modules was somewhat marred by the necessity to unplug—and replug on reassembly, of course—eight unlabeled cables from an interconnect board before the module could be lifted out. This was somewhat irritating, but it was still a fairly straightforward process.

One nice feature of the conventional menu and control system offered for setting operational parameters was the addition of an internal battery that allows you to set the DMX512 start address—and anything else you need to change—while the fixture is unpowered or in its road case. A small switch on the front panel controls this feature (Fig. 20). Another unusual feature you can see in Figure 20 is the wireless DMX antenna on the left of the photo. The Design Spot 1200C comes with an integrated wireless DMX512 link as

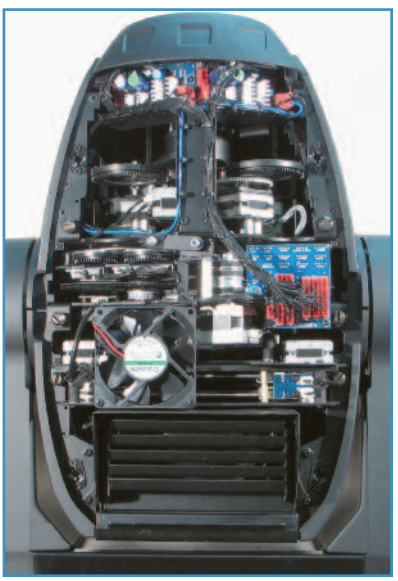

Figure 18 - Head.

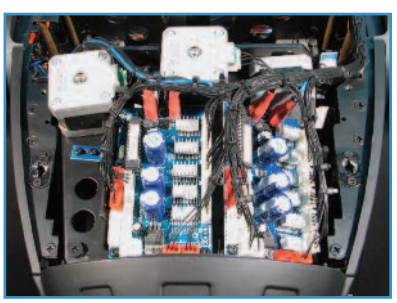

Figure 19 - Drivers.

Figure 20 - Display

Figure 21 - Legend.

standard, designed to work with the company's wireless DMX System. I had no corresponding transmitter, so was unable to test this; however, other users tell me it works well. One small point, which seems trivial but might actually be very useful, is the screen printing of the menu map on the unit just above the menu system itself as shown in Figure 21.

Finally, unlike other Elation units I've seen, I was also delighted to see both standard five-pin XLR connectors as well as the non-standard three-pin variety.

Construction and serviceability

As mentioned above, the optical system is constructed around two main modules—one containing the color-mixing system and the other the gobos and iris systems. Figure 22 shows the reverse side of the gobo module, which also includes the dimmer flag pair. You can also see the two thumb screws that retain the module in the chassis. Everything else in the construction will be recognizable to any competent service tech, and I don't envisage any serious problems in maintaining the unit. One constructional point I should make is that the Design Spot 1200C is relatively small, closer to the normal size for a 700W unit.

Figure 22 - Gobo Module 2.

Well, we've reached the output lens and thus the end of this review. Is the Elation Design Spot 1200C the unit for you? I hope I've given you enough information to help you decide that for yourself. As always, you get to decide...

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