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Clay Paky Alpha Spot 300 HPE

By: Mike Wood

Fig. 1: Unit as tested.

Fig. 2: Lamp.

It's been a while since we last looked at a Clay Paky luminaire, but that's not to say that the company has been idle. Clay Paky has always been a prolific producer of new automated lighting products ever since those first Golden Scans appeared back in the mid-1980s. Back then, Clay Paky and Coemar were two of the largest companies manufacturing automated products (all mirror-based scanners at the time). Both of them were, and still are, based in northern Italy and had access to the innovative design engineering that centered round Turin and the Italian automotive industry. The Italian design flair is well-known, and their products have always been distinctive. However, our concern here is, of course, more performance-centered than aesthetic.


Fig. 3: Lamp change.


Fig. 4: Reflector and cooling.


Fig. 5: Uniform field lens.

This month, we are examining the Clay Paky Alpha Spot 300 HPE (Fig. 1). That's a mouthful of a name for what is actually quite a compact unit. At 300W, it's a few watts up from the more usual 250W units, but clearly competes for the same market segment. How does it compare with its many rivals?

You won't be surprised that this review follows the usual format. I take a single unit supplied to me by the manufacturer and measure everything on that unit as accurately as I can, then give you the basic facts and figures so you have the information to draw your own conclusions. To try and keep things logical, I always start at the lamp and work forward, ending at the output lens.

The Alpha Spot 300 HPE is fitted with universal power supplies and will run on the standard worldwide voltages of 100-120V or 200-240V 50/60Hz. For these tests, it was supplied with a nominal 118V 60Hz and consumed 3.85A for 450W of power at a 0.99 power factor.

Lamp

This is the first time I'd seen this lamp, the Philip's MSR Gold 300/2 FastFit (Fig. 2). The arc tube configuration is conventional, but it uses a smaller variation of the fast-fit base that we've seen on larger lamps. In this case, the base is somewhat simpler than its larger cousins and is symmetrical, so the lamp can be fitted either way round. (The larger lamps have one large pin and one small, so they can only be inserted in one orientation). As always with this system, the lamp change was simple and quick. Remove some captive screws, and the rear plate comes off, exposing the lamp base (Fig. 3). As you can see in the photograph, there are also three lamp-adjustment screws for setting lamp alignment. These screws are also accessible through holes, without having to remove the rear plate. Next is a conventional faceted cold-mirror glass elliptical reflector, but this was not followed by the usual hot mirror. I guess that, at 300W, Clay Paky didn't need it. Right beside the reflector is the high-voltage ignitor connected back to the electronic ballast mounted in the top box (Fig. 4).

Uniform field lens

You would normally expect to see the dimmer next in the chain, but Clay Paky has added a novel optical element. The company calls it a uniform field lens, and, as can be clearly seen in Figure 5, it's constructed as a piece of textured glass with an aperture in the center. Through a DMX512 channel you can select to have this in the optical train or not. When inserted, it does as its name suggests and noticeably flattens the field. The photometrics later in this review tell the story fully, but I should mention now that one frustration with

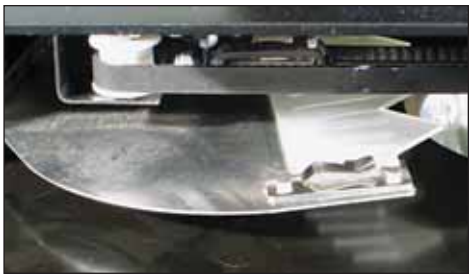

Fig. 6: Dimmer flag.

optics is that you never get something for nothing and, in this case, that more uniform field comes at the expense of some output. With the uniform field lens inserted, the field is flatter, but the output drops to about 75%. For high-quality gobo or corporate logo projection, this may well be an acceptable sacrifice.

Dimmer

Next in line are the dimmer flags. As we saw with the Alpha Spot 1200, Clay Paky uses a pair of metal sawtooth flags with a piece of frosted glass on the edge to smooth the dimming (Fig. 6). The glass also has a sawtooth edge and the output from this system is extremely smooth, with no objectionable edges or artifacts. Clay Paky has done a much better job this time with the dimmer curve (Fig. 7), which falls nicely in between the theoretical linear and square law curves. All in all, it's a very usable dimmer with a nice feel.

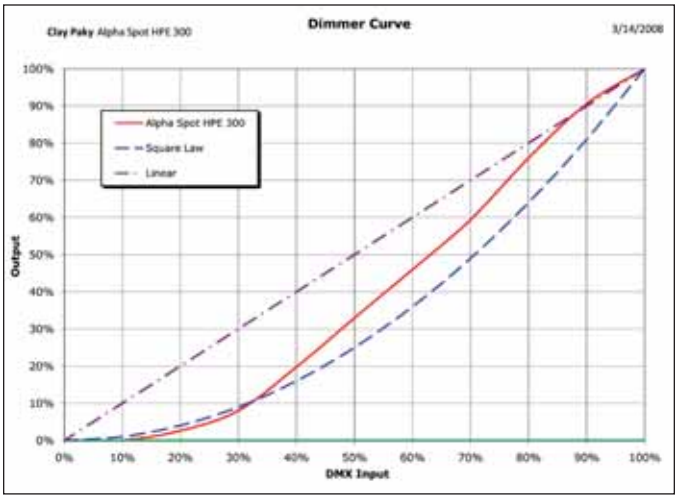

Fig. 7: Dim curve.

Color systems

The color mixing uses a layout which seems to be becoming more popular: three pairs of etched dichroics that open and close like curtains on tracks. I know of at least three manufacturers now using it. The linear motion, and cut-and-etched dichroics, gives a very smooth result, with good control in a compact unit (Fig. 8). Color mixing was smooth across the whole range, and I was able to mix my usual test colors of aqua, lavender, and amber with no problems.

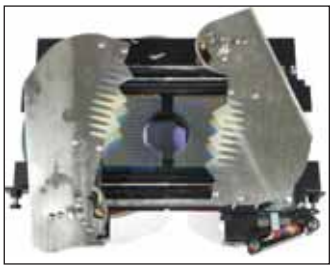

Fig. 8: Dimmer and color mixing.

Color Mixing

Color	Cyan	Magenta	Yellow	Red	Green	Blue
Transmission	19.1%	7.1%	77%	6.3%	7.5%	0.6%

Color change speed - worst case	0.6 sec

Such saturated colors are to be expected with a fixture in this market segment. That very high color temperature lamp gives us the low red output, and the blue is so deep that it suffers from the CIE chart problem we discussed in the last review; the Alpha Spot 300 HPE is actually brighter to the eye in blue than that 0.6% figure might suggest.

Immediately after the color mixing is an aperture plate, followed by the fixed color wheel. This has eight permanently glued trapezoidal dichroic filters (Fig. 9).

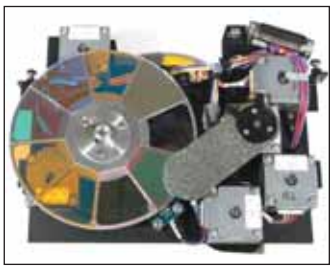

Fig. 9: Color wheel and strobe.

Fixed Color Wheel

Color	Red	Minus Green	CTO 2500	CTO 3200	Green	Aqua	Orange	Blue
Transmission	3.0%	74%	51%	57%	31%	38%	49%	0.8%

Fig. 10: Gobo module.

Fig. 11: Static gobo wheel.

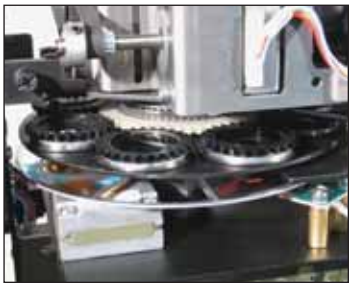

Fig. 12: Rotating gobo wheel.

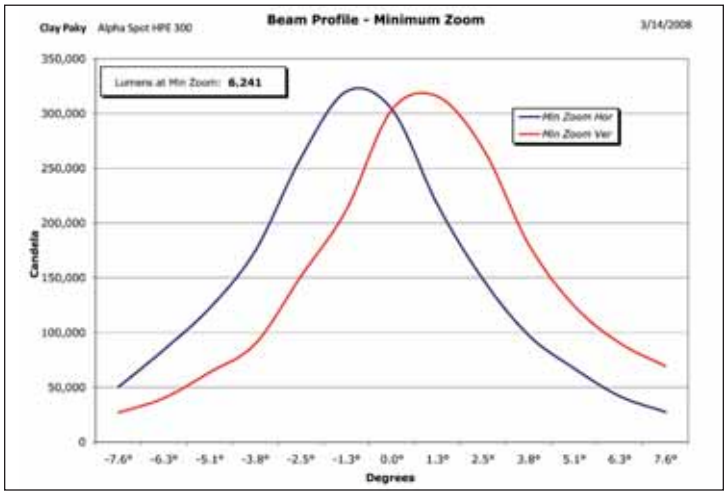

Fig. 13: Output at narrow angle.

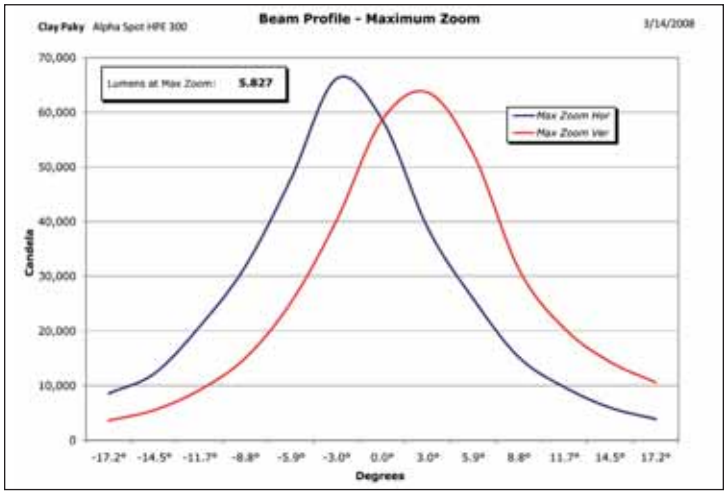

Fig. 14: Output at wide angle.

Clay Paky has gone for color-correction filters with the minus green and two CTOs, as well as some of the harder-to-mix colors or those that benefit from color strobing. Putting red and blue on either side of the open hole was clearly done for effect, and a good effect it is too! The wheel has quick-path, which makes it even better.

I measured the uncorrected color temperature of the unit as a very high 15,200K but the two CTO filters do their job well. I measured the output from the CTO2500 filter at 2,660K and the CTO3200 at 3,420K. Given the range of color temperature of new lamps and the discontinuous spectrum, which makes measuring color temperature difficult, these are all likely within tolerance.

As can be seen in the photograph, the join between colors is fairly small, which means the unit makes good, well-defined half colors.

Color Wheel Speed

Color change speed - adjacent	0.1 sec
Color change speed - worst case	0.3 sec
Maximum wheel spin speed	0.36 sec/rev = 167 rpm
Minimum wheel spin speed	330 sec/rev = 0.18 rpm

As can be seen, the color wheel speed was excellent, with very snappy changes and a good range of wheel rotate speeds.

Strobe shutter

Immediately after the color wheel, and also visible in Figure 8, is the single strobe flag. As a dedicated flag with no need for dimming duty, it can be optimized for speed and definition. I measured the Alpha Spot 300 HPE strobe range as 1Hz to 12Hz.

Iris

The iris is mounted on the back of the gobo module (Fig. 10). When fully closed, it reduces the beam to 20% of the full size—the irised beam is then 3° when zoom is set to the minimum beam angle and at 6.7° when at maximum beam angle. Speed of operation was snappy, with 0.2 seconds movement time from fully open to fully closed. The iris is a little far away from the gobos, so the focal planes are very different, and you cannot get a hard iris cut on a gobo.

Gobos

Next are the two gobo wheels. The Clay Paky Alpha Spot 300 HPE has two gobo wheels: a static wheel, with eight changeable patterns, and a rotating wheel, with seven rotating/indexing gobos (Fig. 11 and 12).

Rotating Gobo

Gobo change time, adjacent apertures	0.4 sec
Gobo change time, max (Gobo 0 to 3)	0.75 sec
Maximum gobo rotate speed	0.27 sec/rev = 225 rpm
Minimum gobo rotate speed	786 sec/rev = 4.6 rph

Positioning and indexing accuracy on the rotating gobos was average. The measured hysteresis error was around 0.21°, which is 0.9" at a 20' throw. My main problem with this wheel was the amount of bobble and judder you got when changing indexing through DMX. Gobo spin was fine, but moving the indexing from one fixed position to another is poor and needs some software improvement; the gobo bobs up and down and judders as the DMX value changes. This problem is exacerbated by the fairly loose engagement of the gobo sun and planet gears, which cause about 0.2° of vertical hysteresis bobble as you change the direction of rotation.

The fixed gobo wheel uses metal patterns and behaves as expected. The change time was good at 0.2 seconds between adjacent gobos and a worst case of 0.4 seconds. This wheel can also spin with a range of speeds from 1.5 sec/rev (40 rpm) down to 65 sec/rev (0.9 rpm). Focus quality across the fields on both wheels was good, and it was also possible to get some gobo morph effects between the two.

Gobo replacement on both wheels was straightforward. As can be seen in Figure 10, the gobos are accessible and can easily be snapped in and out. With the rotating gobo, the entire holder, including its planetary gear, unclips from the wheel, and the gobo can then be replaced on the bench.

If you prefer, it's also possible to remove the entire gobo module as I did for the photograph. It's a simple process, although slightly complicated by the need to move the lens motors out of the way first. It's all pretty straightforward, though; slacken two screws and the plate holding the zoom and focus stepper motors can be slid forward. Once you've done that you can loosen a couple of captive screws, unplug a connector, and lift out the module (Fig. 10) in one piece. It's probably not the way you'd want to change gobos, but it makes for easy access for regular maintenance and cleaning.

The color /dimmer module is easily removed in a similar manner (although there is no need to move the lens motors this time) and the front and back of this module are shown in Figures 8 and 9.

Lenses and output

The Alpha Spot 300 HPE has the usual three-group-projection-lens system. The first two groups both move, providing focus and zoom, and the final group is the static front lens. Clay Paky has a reputation for good optics, and the system lived up to expectations with very acceptable levels of the usual spherical and chromatic aberrations. The end-to-end movement time was 2.3 seconds for the zoom lens and 1.5 seconds for focus. As with all three-group systems, although we typically call them the zoom-and-focus lenses, in reality, the movement of both groups interact somewhat, contributing to both functions.

The measured zoom range without the uniform field lens was 15.2° to 34.5° (2.3:1) with a total output ranging from 6,240 lumens in narrow to 5,830 lumens in wide. These are excellent figures for a 300W unit and indicative of Clay Paky's move away from its long-beloved flat-field, but inefficient, condenser optics to more conventional ellipsoidal

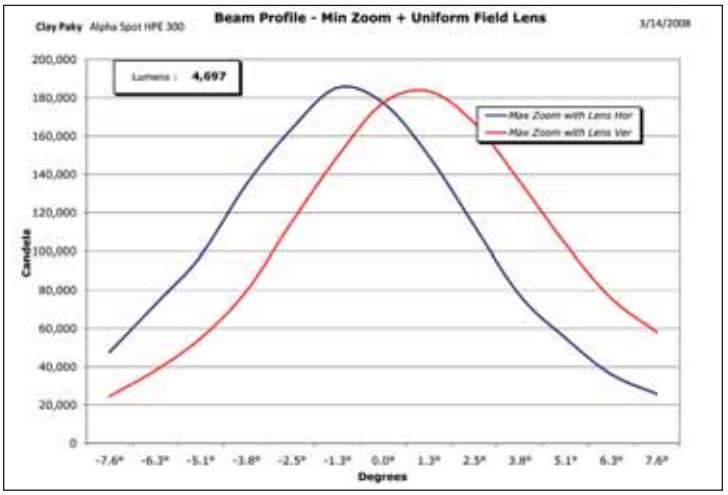

Fig. 15: Output with uniform field lens.

Fig. 17: Top box electronics.

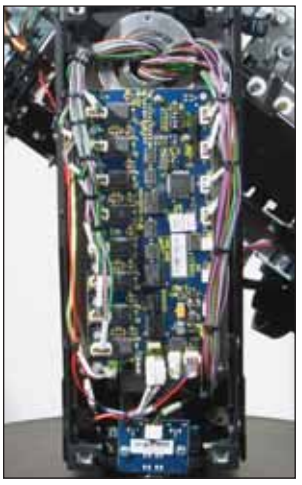

Fig. 16: Motor drivers.

Fig. 18: Display.

Fig. 19: Lamp power supply.

optics. The output was indeed as expected from ellipsoidal optics, with something of a hot spot, but the overall result was smooth and clean, as can be seen from the output curves (Fig. 13 and 14).

Adding in the uniform field lens visibly flattened the field and reduced the output by about 25% to 4,700 lumens in narrow angle (Fig. 15).

Prism and frost

Prism and frost are listed together, although they are completely separate mechanisms, as they share a common slot in the optical train between the zoom and focus lenses. That means they are mutually exclusive—you can't use frost and the prism at the same time. That's not really a problem, I think.

Additionally, depending on the current zoom and focus positions, the lenses have to move slightly to allow access for the prism. This all happens automatically, and the net result is just a slight time delay, while the lenses move before the prism comes in. Total time for prism insertion is around 1.5 seconds. The prism is a single, rotating five-facet prism, which gives good image separation. Rotation speeds for the prism ranged from 70rpm all the way down to a very slow 1.25rph.

The frost system is a single filter on a flag and isn't variable—it's either fully in or fully out, and takes about 0.3 seconds to add or remove. When inserted, the effect is quite dense and completely washes out gobo images. It's more of a wash effect at that point than a frost, to my mind.

Pan and tilt

The Alpha Spot 300 HPE has pan and tilt ranges of 540° and 250°, respectively. The movement speed was excellent, with a full-range pan move taking 3.5 seconds and a more typical 180° move 2 seconds. For tilt the figures were 2.1 seconds for the full range and 1.8 seconds for 180°.

The positional repeatability accuracy for both pan and tilt was 0.11°, or around 0.4" at a 20' throw. Clay Paky has done a good job at controlling the acceleration and deceleration at these speeds, and the unit comes to a very controlled and steady stop with minimal settling bounce or overshoot; it's a nicely damped system.

Noise

The Alpha Spot 300 HPE is a very quiet fixture just about all the time, with some functions, such as frost and strobe, inaudible above the regular, but quiet, fan. The one exception was pan, which, when moving at higher speeds, had a very noticeable whine. The focus lens also had a slightly noisy resonance at some speeds.

Sound Levels

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	41.6 dBA at 1m
Homing/Initialization	62.0 dBA at 1m
Pan	62.4 dBA at 1m
Tilt	45.2 dBA at 1m
Color	43.4 dBA at 1m
Color Mix	43.8 dBA at 1m
Iris	43.5 dBA at 1m
Prism	46.0 dBA at 1m
Gobo rotate	44.2 dBA at 1m
Gobo select	45.4 dBA at 1m
Zoom	49.1 dBA at 1m
Focus	51.6 dBA at 1m
Strobe	41.6 dBA at 1m
Frost	41.6 dBA at 1m

Homing/initialization time

The Alpha Spot 300 HPE took 46 seconds to complete a full initialization and, I'm delighted to say, behaved correctly at the end of initialization by not bringing the lamp output up until all motors had reached their programmed positions. It also opened the dimmer with a nice fade up rather than a "snap open"—very elegant.

Electronics and control

Electronics and motor drivers are split between the top box and one of the yoke arms (Fig. 16 and 17). Access is straightforward and the boards and connections are clearly laid out.

The four-character menu display system (Fig. 18) has a typical selection of options and test routines to set up and use the unit. It also has the extra feature of battery power, so that you can set fixture addressing and other parameters when the unit is powered down or in its road case. The fairly large sealed lead acid battery used for this can be seen at the bottom right of Figure 17. Clay Paky provides both three-pin and five-pin XLRs for DMX-512.

For lamp power, the Alpha Spot 300 HPE uses an electronic supply from Schiederwerk, a well-known manufacturer in this field. The company also provides the lamp ignitor (Fig. 19).

Construction and service-ability

Construction is straightforward and follows the common model of a rigid central framework into which various optical modules are fitted with non-structural decorative plastic covers on the outside. Remove the plastic covers and everything is exposed for cleaning and service (Fig. 20). It's the same with the yoke arms (Fig. 21).

As I mentioned earlier, the gobo and color/dimmer modules can be fully removed from the unit for bench service or repair. I did it easily without reading the manual—but who does that, anyway?

These reviews don't reflect long-term use or reliability; however, no obvious problems came up during the few days I had the luminaire. I would expect the unit to present no problems to a competent service technician to maintain.

So, there we are, the Clay Paky Alpha Spot HPE 300, one of the latest products from their Bergamo factory. How would it work on your production? As ever, you get to decide…

Fig. 20: Head.

Fig. 21: Tilt.

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