Fig. 1

The Clay Paky Alpha Spot HPE 1200

by Mike Wood

Fig. 2: Lamp and reflector

Fig. 3: Dimmer flag showing frost glass

Clay Paky has been manufacturing moving lights for just about as long as anyone; the company's original GoldenScan (actually, I think the first model was the RubyScan in 1985) was seminal in establishing the acceptability of scanner fixtures in professional markets outside of discotheques and nightclubs.

More recently, Clay Paky fixtures have become synonymous with the use of condenser-based optical systems. This choice meant that their image quality and field flatness was exceptional; however, fixture brightness wasn't always quite up to the competing ellipsoidal units.

The Alpha Spot HPE range diverges from this philosophy and utilizes the now almost completely ubiquitous short-arc lamp/dichroic ellipsoidal reflector combination. Has this change been a good one for Clay Paky and how does the Alpha Spot HPE 1200 measure up to the competition at the top end of the market? This review seeks to find out.

As usual, the review works through the light in a logical order, from lamp to lens, and tries to present results in an objective manner. All reported results are based on multiple averaged readings taken from one specific fixture supplied to me as representative of the product by Clay Paky America—thus, your tests may differ slightly. I don't tweak or recalibrate the units; I want the test results to represent the reality of a standard fixture as it is shipped to the customer. (Figure 1: Unit as tested)

Although the Alpha Spot HPE 1200 is fitted with an electronic switching lamp power supply and can run on voltages between 100-120V or between 200-240V, it doesn't auto-sense and the user must select the voltage via a switch on the outside of the unit underneath the carrying handle. The unit was tested at both voltage ranges and measurements were taken when run at 116V, 60Hz.

Lamp

The unit was supplied and tested with the Osram HMI 1200 W/S double-ended discharge lamp rather than the HTI 1200 W/D7/60 lamp, which the literature talks about. Both the HTI and HMI versions are nominal daylight lamps rated at 6,000K color temperature, with almost identical specifications; both are fitted with the XS "Extreme Seal" plated pinch-foil technology we've discussed before in these reviews. This development facilitates shorter arc gaps and, thus, high optical efficiencies. All these lamps require forced cooling.

The double-ended lamp is mounted on a lampholder plate, which is retained by two quarter-turn fasteners; once released, it pulls out and down for lamp access. Lamp change is very easy and straightforward, with all parts remaining captive. (Figure 2: Lamp and reflector)

Figure 2 also clearly shows the faceted cold-mirror reflector with its large slots to accommodate the double-ended lamp; this arrangement is very common in modern fixtures and inevitably causes the beam to be somewhat asymmetrical, although Clay Paky has done an excellent job of controlling this through the design of the reflector facets.

As mentioned earlier, lamp power comes from an electronic, square-wave, "flicker-free" ballast. The supply itself is a very familiar component, supplied by Schiederwerk. That company's supplies are used by many manufacturers in our industry and are known to be solid and reliable.

The lamp is well-cooled and I saw no evidence of overheating or other problems during my tests. The whole of the rear lamp house is sealed off with a hot mirror and Clay Paky does a good job of compartmentalizing the heat and keeping it away from downstream components.

Dimmer

The dimmer flags are mounted immediately after the first hot mirror (Figure 3: Dimmer flag showing frost glass). The Alpha Spot uses standard "serrated-teeth" cut flags, but with the addition of frosted glass attached to the fingers, to improve the dimming softness and avoid dimming artifacts. The photograph shows one flag with the attached glass inserted into the beam—the system uses two of these flags when dimming.

The dimming system also uses the capabilities of the electronic ballast and simultaneously reduces the lamp wattage down from 1,200W to 600W as the blades close. This combined system worked extremely well and the dimming was possibly the best I've seen in a discharge spot unit—very clean and smooth, with no "jaggies," or artifacts, even at the lowest levels. Unfortunately, this excellent optical system is somewhat let down by a very poor choice of dimming curve (Figure 4: Dimmer curve), where everything useful happens in the top 20% of the dimmer. The unit is down to under 10% output when the control channel is still at 60% and is essentially out when the control channel is at 40%. This is a real waste of resolution and means that the Alpha Scan will dim differently from everything else in the rig, unless the user creates a custom dimmer curve on the control desk. This is something Clay Paky could improve on very easily with a software revision to really show off and capitalize on this excellent dimmer.

As mentioned above, the fixture reduces the lamp power to 600W when the unit is dimmed or blacked out through the strobe flags for more than three seconds, reverting to the full 1,200W as the strobe flags open or the dimmer channel returns to 100%. The lamp recovered very quickly and no color shift was apparent.

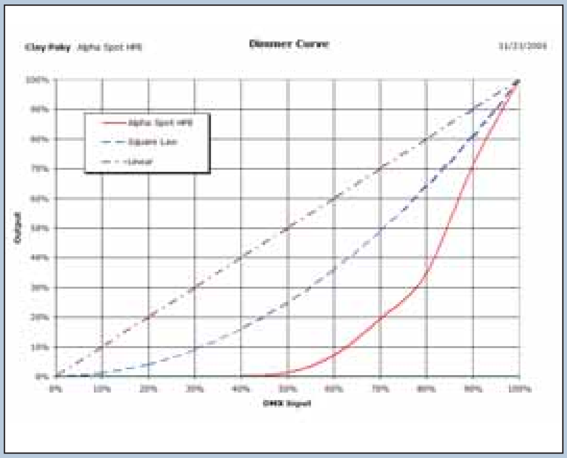

Fig. 4: Dimmer curve

Color-mixing

Next in line is the color-mixing system. The Alpha Spot uses a linear "pair-of-curtains" system with etched dichroic blades in each of four colors—cyan, magenta, yellow, and CTO. Each color uses two blades, which move into the beam from opposite sides.

The resultant color-mixing is acceptably smooth, with little visible aberration in the beam. You can see some color-fringing on the sides of the beam when focused on a gobo and mixing pastel colors (Figure 5: Color fringing) but nothing worse than competitive units. This is one area where Clay Paky has inevitably had to compromise slightly from the almost perfect flat mixing of its units with condenser optics.

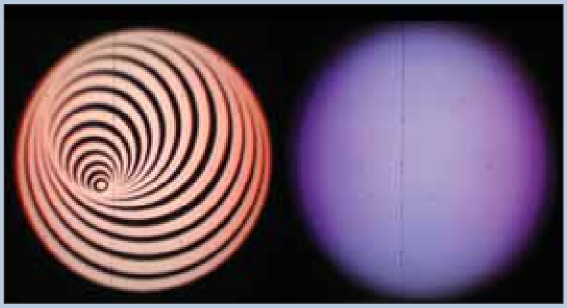
Fig. 5: Color fringing

Color mixing

Color	Cyan	Magenta	Yellow	Red	Green	Blue
Transmission	36%	15%	50%	6%	4%	6%

Color change speed – end to end	0.6 sec

The transmission data above shows that Clay Paky has chosen fairly saturated colors for its mixing colors with 4-6% transmission when mixed to the full primaries. The variable CTO system performs well and can be used as a color modifier with the color-mix system, if desired, to help make some pastel colors.

Unusually, the Alpha Spot has a second hot mirror, mounted immediately after the color-mix assembly—I'm sure this is to keep the gobo system as cool as possible. There is a lot of hardware mounted in a very small space, and cooling these systems must have been difficult (Figure 6: Fixture optics). It certainly works well and the downstream optics are kept very cool.

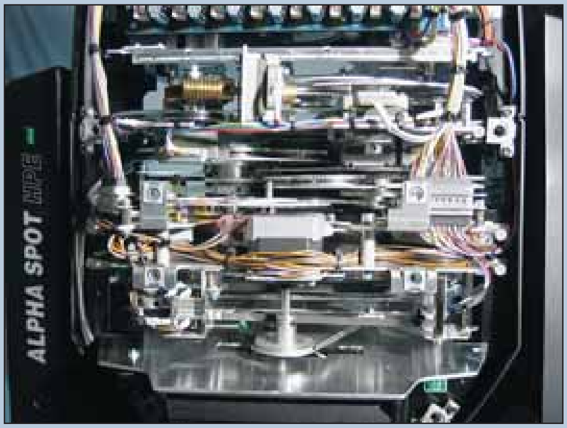

Fig. 6: Fixture optics

Strobe

Next in the optical train are the strobe flags, it is getting unusual to find strobes separate from the dimmer these days, but it does make sense. The needs of both are different—the dimmer needs to be as far out of the focal plane as possible and, preferably, somewhere where the beam is large, to give you smooth dimming. The strobe system, on the other hand, can be positioned where the beam is much smaller, allowing for short flag movement and, thus, high speeds. The Alpha strobe system was excellent—using two opposing flags for maximum speed, it was solid and smooth with a measured range of 1-12Hz.

Color wheel

Completing the Alpha Spot's color system is a fixed color wheel (six colors + white). The manual talks about these being removable; however, in the test unit provided, the colors were glued in (Figure 7: Color wheel) and would be difficult to change. (Note: Clay Paky tells me that this has been changed in current production units and the colors are now fitted without glue and are fully replaceable.) The system allows half

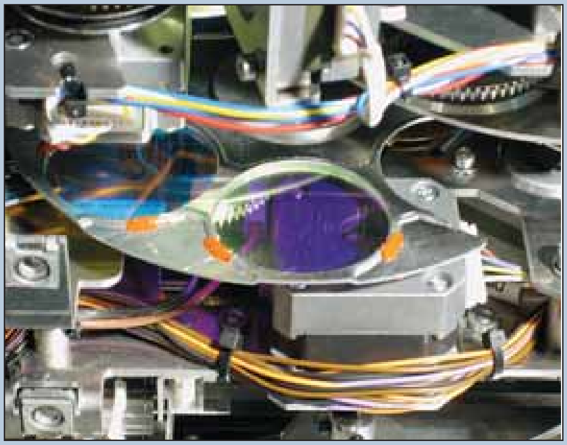
Fig. 7: Color wheel

Fig. 8: Half colors

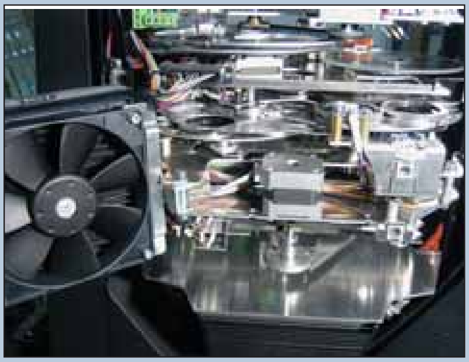

Fig. 9: Fan flips up for access to gobos

Fig. 10: Snap-in gobos

Fig. 11: Fixed gobo wheel with magnetic hub attachment

colors, but, because of the offset positioning of the wheel in the packed optical compartment, the transition line between colors is slightly oblique and varies a little as you rotate the wheel (Figure 8: Half colors). The dichroics are close together and there is little or no black transition bar between the colors.

Color Wheel

Color	Red	Yellow	Violet	Green	Orange	Blue
Transmission	7.2%	62%	23%	34%	14%	33%

There is a good choice of colors, with a nice clean red and a good orange—always a tough color to get with a mixing system.

Color change speed was good—not the fastest I've seen, but crisp and definite.

Color Wheel

Color change speed – adjacent	0.3 sec
Color change speed – worst case	0.6 sec (quick-path enabled)
Maximum wheel spin speed	0.3 sec/rev = 200 rpm
Minimum wheel spin speed	410 sec/rev = 0.15 rpm

Through the menuing system, you can select various modes of operation for the color wheel—for example, you can choose if the wheel can rotate continuously or if it will "jump" between full and half-colors. Noteworthy here is the very slow wheel-rotate speed possible—it's so slow as to be almost imperceptible. Another menu option is to use quick-path, so the direction of wheel movement always gives you the fastest change possible.

Gobos

The Alpha Spot 1200HPE has three gobo wheels—the first and last contain six rotating patterns plus open hole, while the center wheel contains eight fixed patterns. Clay Paky has tried to make it as easy as possible to access and change the gobos. For example, one of the lamp fans flips up on a spring to give clear access to the rotating gobo wheels (Figure 9: Fan flips up for access to gobos) and the rotating gobos snap in and out very easily with no requirement for tools (Figure 10: Snap-in gobos).

Most noteworthy is the system used for the fixed wheel—to change the gobos, you need to remove the whole wheel. This could be a real problem, so Clay Paky has tried to make it easy by attaching the wheel with a magnetic hub (Figure 11: Fixed gobo wheel with magnetic hub attachment). To remove the wheel, you just snap it away from the center magnet and slide it out. Putting it back is a little trickier, as you need to ensure the ident hole is correctly installed over the locating pin on the hub. It takes a little practice to get right, but, once mastered, it's a neat technique.

Rotating Gobos (Gobo 1 and Gobo 2)

Gobo change time, adjacent apertures	0.65 sec
Gobo change time, max (Gobo 0 to 3)	1.5 sec
Maximum gobo rotate speed	0.5 sec/rev = 120 rpm
Minimum gobo rotate speed	1080 sec/rev = 0.056 rpm

Indexing and wheel-positioning accuracy on the rotating gobos was a little weak. Measured hysteresis error was around 0.4°, which is approximately 1.5" at a 20' throw. Wheel positioning was not quick-path-enabled, resulting in the relatively slow, 1.5 seconds of movement from Gobo 1 to Gobo 6.

As with the fixed color wheel, it is possible to select an extremely slow gobo-rotation speed—this rotation is smooth and clean. Clay Paky has chosen to populate Rotating Gobo Wheel 2 primarily with effects glasses—however, it is possible to use and focus on standard patterns as well. I did have a problem with Rotating Gobo Wheel 1—if you are in narrow zoom (less than 20%) then you can't focus on this wheel at throws less than 20'. Wheel 2 does not have this problem, so this might help determine which wheel you should use depending on your particular rig layout.

Fixed Gobo

Gobo change time, adjacent apertures	0.25 sec
Gobo change time, max (Gobo 0 to 4)	0.5 sec
Maximum wheel spin speed	1.5 sec/rev = 40 rpm
Minimum wheel spin speed	65 sec/rev = 0.9 rpm

The fixed gobo wheel had a little bounce when coming to a halt but otherwise performed well. The open aperture on this wheel is a little too large, as you can see a sliver of it when positioned on the adjacent Patterns 1 or 8. You can work around this by closing the iris slightly. [Note: Clay Paky reports that the software has been adjusted to address this problem in current production units.] Fixed gobo change is quick-path-enabled ,helping achieve the very respectable gobo change times reported.

The big change here for Clay Paky with ellipsoidal optics is the ability to effectively morph between gobos. The Alpha spot performs this effect well—Figure 12 shows a morph sequence between the

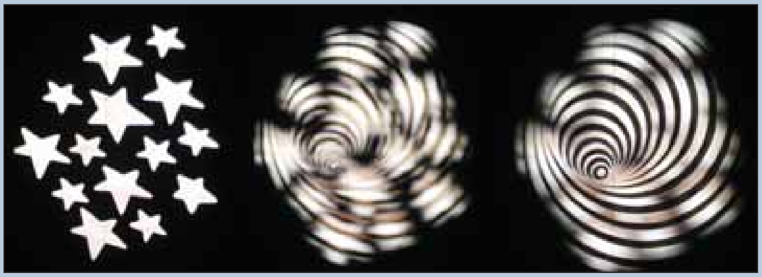

Fig. 12: Gobo morph sequence

Fig. 13: Graphic disk with magnetic hub

Fig. 14: Graphic wheel worm drive

two rotating gobo wheels transitioning from Gobo 1 (left) to Gobo 2 (right).

Iris

Next in line is a standard multi-leaf iris, which reduces the beam size to 19% of the full size when fully closed—i.e., 2° when at minimum beam angle and 6° when at maximum beam angle. Movement time from fully open to fully closed is a very respectable 0.2 seconds.

Graphic disc

This is a new feature in moving lights—it's not the same as the animation wheel used in some competitive units. Essentially, the graphic disc is a large diameter pattern or effects glass (Figure 13: Graphic disc with magnetic hub) which can be moved in or out of the optical path through a worm-drive gear mechanism (Figure 14: Graphic wheel worm drive) and rotated across the beam. I'm not sure what the intended benefit of this wheel is over the more conventional effects glass mounted in Gobo Wheel 2 or the effects wheel. The normal reason for a large-diameter pattern is so that you can change the center of rotation, giving vertical or horizontal motion to the image (or anything in between). However the Alpha Spot mechanism doesn't allow for altering this axis and thus has a fixed direction and pattern of movement—nor can you index the wheel to accurately position a pattern. This all seems rather limiting to me.

It does however allow a good range of rotation speeds, ranging from 120rpm down to an almost imperceptibly slow 4.4rph and, as such, could be useful for some subtle background effects.

If the graphic disc does do what you want, then you'll love the disc change. It uses the same magnetic hub system as the fixed gobo wheel and, because it doesn't have the locating pin, it is simple to remove and install.

Prism/lens wheel

We haven't finished with effects; this unit is very comprehensively equipped—in addition to the wheels already mentioned, the Alpha Spot has a separate dedicated rotating prism/lens wheel. This contains both two- and nine-facet prisms, as well as a supplementary wide-angle lens, which increases the maximum field angle from 31° to nearly 40°.

The prisms are conventional and, unfortunately, are another victim of Clay Paky's move to ellipsoidal optics. The image separation is small and image-focus quality is reduced. It's not the fixture's strongest point.

The field-angle increase from the supplementary lens is useful for color washes but does have its limitations—you inevitably lose a little focus quality with the lens inserted and, more significantly, you are able to focus only on Gobo Wheel 2 at throws less than 25'. Chances are, you need the wider angle, precisely because you are on a short throw—but then, you can't use either Gobo 1 or the fixed gobo wheel. This lens is fine for ultra-wide color washes but not for short throw gobo washes. Consequently, if gobo projection is important to your plot, then plan your rig around the standard 31° field angle without the supplementary lens.

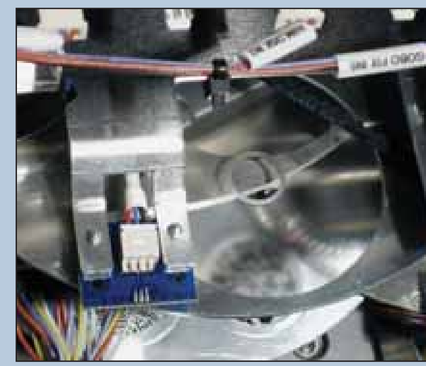

Fig. 15: Light frost

Fig. 16: Focus versus frost

Prism Wheel

Prism change time	1.5 sec
Supplementary lens insertion time	1,8 sec
Maximum prism spin speed	0.53 sec/rev = 112 rpm
Minimum prism spin speed	3 rph

Frost

The final effect in the chain is a frost wheel. This contains three grades of frost: light, medium, and heavy—and is a truly excellent system. Figure 15 shows the light frost disc, with its characteristic center hole (Figure 15: Light frost). Frost change time was 0.6 seconds.

This is a good opportunity to show the difference between what a good frost system can produce as compared with simply taking an image into soft focus—the results can be very different.

Figure 16 shows two side-by-side images; on the left is a defocused image and on the right is the same pattern, hard-

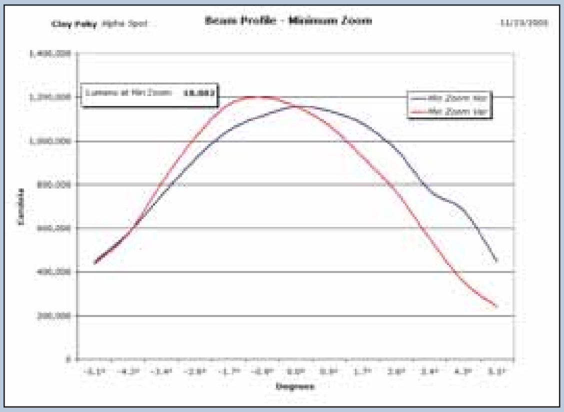

Fig. 17: Output at narrow angle

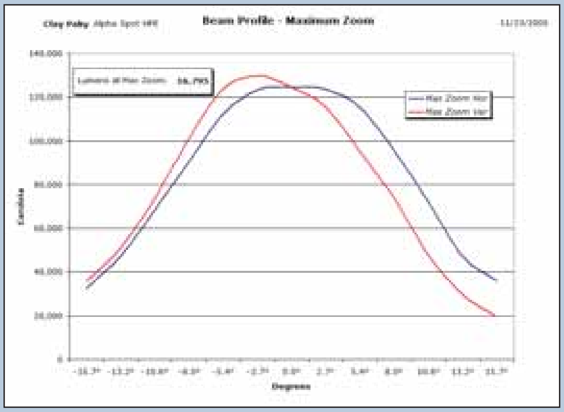

Fig. 18: Output at wide angle

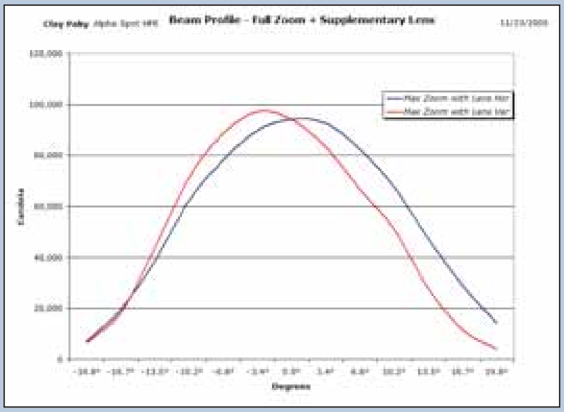

Fig. 19: Wide angle with supplementary lens

Fig. 20: Sealed lead-acid battery

focused but with medium frost (Figure 16: Focus versus frost). The difference is apparent—the defocused image shows multiple edges, with some color fringing caused by increased chromatic aberration when out of focus, and it still retains a high contrast ratio between peak black and peak white; in contrast, the frosted image shows uniformly soft, diffuse edges, no color-fringing, and an overall reduction in contrast ratio across the whole image. To my mind, the frost gives a much more pleasing soft effect.

Frost systems in automated lights are often neglected and don't always work as well as they should—the Alpha Spot shows what can be achieved when it's done right.

Lenses and output

The Alpha Spot 1200 HPE uses a three-group system: Groups One and Two move, providing zoom and focus, while the final group is the static front lens.

The optical performance is excellent, with almost no apparent chromatic and spherical aberration. Lens-movement time, from end to end, was 1.5 seconds for zoom and 1 second for focus. Measured field angle, as the fixture was zoomed field, ranged from 10-31°, with corresponding total lumens of 18,082 lumens at narrow angle and 16,795 lumens at wide (Figure 17: Output at narrow angle; Figure 18: Output at wide angle).

With the supplementary lens inserted, the maximum field angle increased to 40°, while total field lumens dropped very slightly to 16,570 lumens (Fig 19: Wide angle with supplementary lens).

The 3:1 zoom range and output are on par for a fixture in this class, comparing well with the competition.

Pan and tilt

No surprises here—the pan and tilt has a reasonable range of 450° x 250° and the movement speed was acceptable. A full-range, 450°-pan move is complete in six seconds while a more typical 180° move takes four. For tilt, the corresponding figures are 4.3 seconds for a full range 250° move and 3.8 seconds for a 180° move. The mechanism uses a mildly unusual construction, in that the pan motor is mounted in the yoke and drives itself, and the yoke, around a stationary pulley in the base. It's all good and solid and has the customary Clay Paky yoke locks on both pan and tilt.

Positional repeatability accuracy on pan and tilt was good at 0.1° and 0.2° respectively—that's around 0.4-0.8" at a 20' throw. There was a slight settling bounce, particularly noticeable on tilt, when coming to a rest from a high speed move of about double this amount.

Noise

Overall, sound levels for the Alpha Spot were on the low side for fixtures of this size and power. I noted a couple of resonances but nothing too unpleasant and no "whining." Pan and tilt were the noisiest motors and this is reduced by using slower speed moves. The graphic wheel has a mild but apparent "clunk" as it comes into position, not loud but noticeable.

Sound Levels in Normal Mode

Ambient	<35 dBA at 1m	Graphic Disc	50 dBA at 1m
Stationary	48 dBA at 1m	Prisms / Effects	50 dBA at 1m
Homing/Initialization	56 dBA at 1m	Gobo rotate	50 dBA at 1m
Pan	56 dBA at 1m	Zoom	52 dBA at 1m
Tilt	55 dBA at 1m	Focus	51 dBA at 1m
Color	50 dBA at 1m	Strobe	49 dBA at 1m

Electrical Parameters

Power consumption at 116V, 60Hz

	Current, RMS	Power, W	Power Factor
Initializing	13.1A	1,517W	0.99
Normal running – stationary	13.3A	1,540W	0.99
Normal running – all moving	13.6A	1,575W	0.99

Homing/initialization time

This is 27 seconds when the fixture is powered up and “reset” command sent.

Electronics and control

A new feature with the Alpha Spot 1200HPE is the provision of an internal battery for the menuing system, allowing the user to preset the DMX512 address and menu options while the unit is still in its road case without power. It’s a large LED display and so needs quite a lot of power—thus, the substantial sealed lead-acid battery shown in Figure 20 (Figure 20: Sealed Lead-Acid Battery).

The electronics is a distributed system with a single master circuit board in the top-box and multiple motor driver boards throughout the unit, all connected through a high-speed serial bus. Figure 21 shows two of these boards mounted at the front of the head, above the zoom lens system (Figure 21: main head motor drivers). The motor-drive circuitry is a well-established design, using standard drivers, and should be reliable.

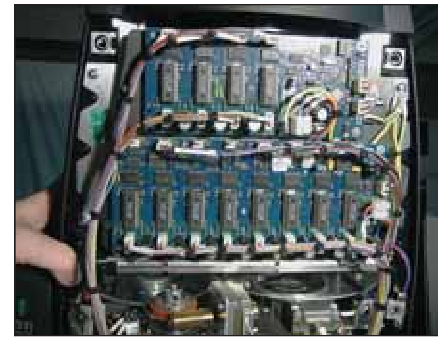

Fig. 21: Main head motor drivers

The menu system includes the options and selections one has come to expect and the fixture offers both five-pin and three-pin XLRs for DMX512, as well as a currently unused RJ45 socket labeled “Future Ethernet.”

The Alpha Spot 1200 HPE shows some new features and some old favorites in a solid package. It also shows a move by Clay Paky into ellipsoidal optics. Was that the right decision for them to make and is the product right for you? As usual, I leave you to draw your own conclusions and hope this review helps you make that decision.

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