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Robe's ColorSpot 1200E AT

Fig. 1

Fig. 2

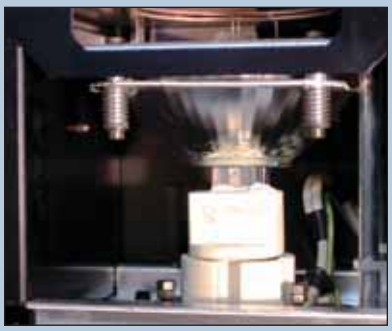

Fig. 3

Fig. 4

A few years ago, Robe Show Lighting seemed to spring up magically out of nowhere, with a complete range of products. In fact, the company has been around a long time, but its name was hidden from us. Only fairly recently did it start shipping under the Robe banner; before that, it was a contract manufacturer based in the Czech Republic, supplying products on to other companies on an OEM basis. Now Robe has hit the ground running with a full range of well-priced moving-light fixtures.

Robe's products are aimed at all sectors of the market; however, for this review, we've chosen the top-of-the-range Color Spot 1200E AT. A full-featured 1,200W spot fixture, it is clearly aimed as competition for the ubiquitous Martin MAC 2000, the Vari*Lite VL3000 and others at the professional end of the market. So how does it stand up? (Fig. 1)

I'm trying to keep these reviews consistent in style and format, so that comparison will become possible as the library grows. The format works forward, from lamp to output lens, and the results measured are presented in as objective a manner as possible. The data presented here is based on the testing of one brand-new, specific unit supplied to me by the manufacturer; other units may, of course, vary slightly. I take multiple readings of measurements and average them to ensure repeatability.

Let's start with the power input: the ColorSpot 1200E AT is not fully auto-sensing for supply voltage—which is slightly unusual these days. The lamp power supply is auto-sensing, but the motor power supply is a conventional transformer system and thus the tapping has to be set to the relevant local supply voltage, choosing the normal selection from 100V to 250V 50/60Hz. For these tests, the fixture was set to the 120V setting and run at a nominal 118V/60Hz.

Lamp

The lamp of Robe's choice is the Philips MSR 1200sa—the bare-envelope short-arc version of the MSR 1200. These high-power short-arc lamps have become the standard choice for units in this class. The short arc enables a more efficient optical system and increased zoom range without requiring a huge unit. We wouldn't have these high-output moving-yoke units without the improvements in short-arc lamps that we've seen in recent years from Philips and Osram.

The lamp is mounted on a rear plate and is removed by releasing two quarter-turn fasteners; once released, the entire assembly pulls out for access. All parts remain captive, so this is a task that can safely be done in the truss or from a ladder. I have to say this mechanism was very stiff and I had some trouble persuading the plate to move; it needed a little levering from a screwdriver, but, once I got it started, everything was easy (Fig. 2).

These short-arc lamps are the thoroughbred racehorses of the lamp world and need a lot of tender loving care. Cooling is absolutely critical and this must be through directed, forced cooling. You can't even run these lamps in the open air without blowing a fan on them, much less cooping them up inside a lighting fixture. Robe has done a nice job of keeping the lamp cool and getting the heat outside the fixture. The lamp is completely contained in its own compartment and the heat is vented straight out the sides of the unit.

The lamp is mounted conventionally—axially, in a faceted cold-mirror reflector (Fig. 3)—with a further hot-mirror downstream to get as much heat as possible out of the main beam.

Lamp power comes from an electronic, square-wave "flicker-free" ballast mounted in the top box. This is from a manufacturer, Schiederwerk, used by a number of moving-light companies and is known to be a good, reliable unit. The lamp ignitor is mounted in the head just above the lens, keeping the high-voltage cables short.

Dimmer and strobe

Immediately after the hot mirror is the dimmer/shutter. This uses a pair of flags, each with its own motor. Each flag is shaped with two semicircular cut-outs (Fig. 4). The fixture firmware gives the choice of two dimmer curves, as can be seen in Figure 5. Dimmer Curve 2 is by far the better option, in my opinion; it gives a nice square law output with good control over the whole range. Dimmer Curve 1, in comparison, is very abrupt, with almost no control at the top of the curve. Whichever mode is used, you do get visible artifacts from the dimmer flags visible in the beam. As you start to dim down, the beam is shadowed/vignetted from each side and, once you get below 40%, you start to see two bright

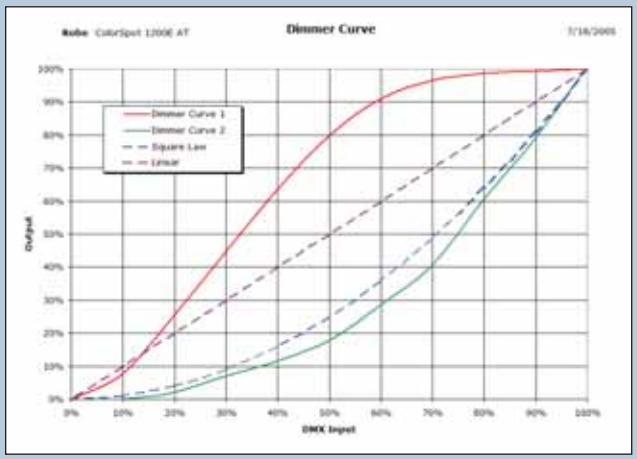

Fig. 5

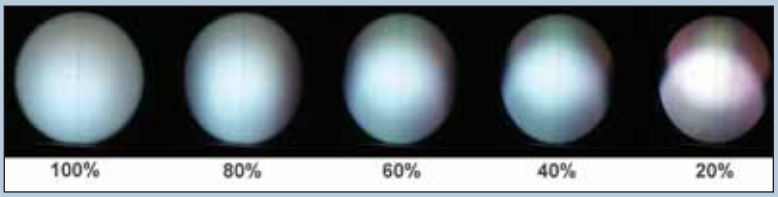

Fig. 6

spots corresponding to the two cut outs in the dim flags (Fig. 6).

The strobe system, which uses the same flags, is very quick and precise, with a speed range from 0.28Hz up to over 12Hz. In addition, you can use the lamp power supply to provide very fast "zap" strobing.

Color systems

The Robe ColorSpot 1200E AT has full CMY color-mixing, plus the increasingly common addition of a fourth variable CTO filter. In addition, it has a fixed color wheel, with six interchangeable colors. The color-mixing uses opposed gradated filters, running on linear tracks, something like pairs of curtains. Each filter is shaped and etched to improve the smoothness of the mix. The length of travel the track system gives aids smooth color-mixing but results in fairly slow snap changes to saturated colors (Fig. 7).

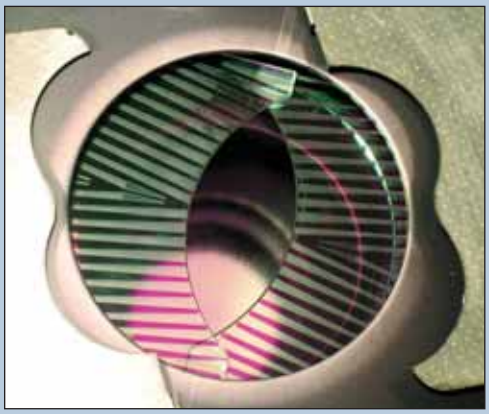

Fig. 7

The ColorSpot also has an homogenizing filter immediately after the color-mixing system to further homogenize the colored beam. I suspect Robe used this to try and keep the optical path as short as possible and therefore present a compact fixture; however, it must inevitably cause some loss in light output. The filter can be seen in Figure 8, beneath the color mixing system. The entire system, with the linear gradient and diffuser, does, on the whole, produce smooth, even colors, with a particularly good range of blues—all the way from a pale pastel to a good deep blue (Fig. 9) and a good aqua. However there are still a couple of problem areas—Orange/Amber has a distinct Red/Magenta border (Fig. 10) and lavenders are somewhat uneven. These are minor quibbles, though—overall, it's an excellent color-mixing system.

Fig. 8

Color mixing

Color	Cyan	Magenta	Yellow	Red	Green	Blue
Transmission	49%	14%	59%	3.5%	21%	9%

Color change speed - worst case	0.8 sec

These transmission figures are typical for a fixture with a high-color temperature lamp, like the MSR 1200sa.

Fig. 9

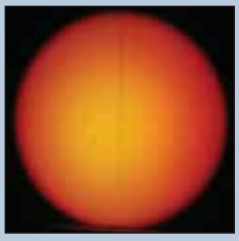

Fig. 10

The fixed color wheel, like the gobo and effects wheels, uses a snap-in cartridge method for changing colors. This mechanism makes all effects and colors very easy to remove and replace (Fig. 11).

Fixed Color Wheel

Color	Dark Red	Dark Blue	Green	Orange	CTB	UV
Transmission	4%	15%	36%	36%	50%	8%

Fig. 11

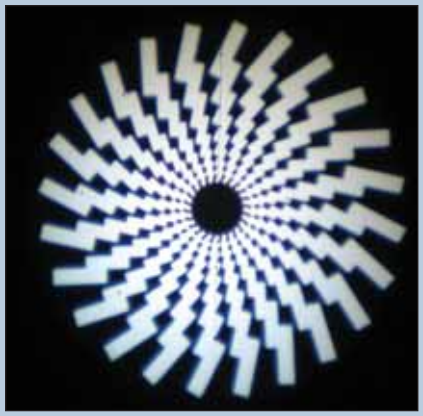

Fig. 12

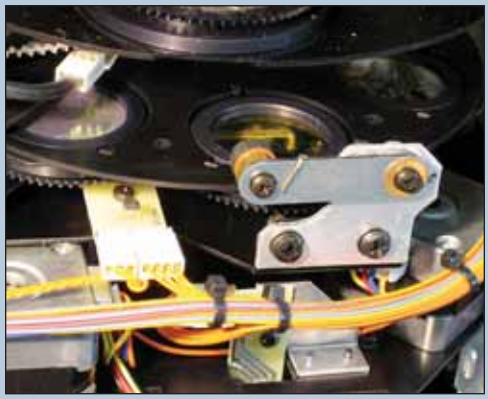

Fig. 13

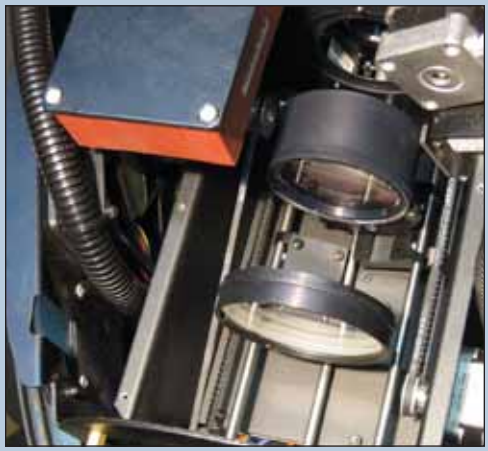

Fig. 14

The colors chosen for the fixed wheel are good—perhaps the orange was chosen deliberately to compensate for the slight problem area in the color-mixing? The CTB can also be used as a color modifier for the main color system.

Color-change speed is a little slower than I would like, but adequate, and the colors are widely separated, so half-colors don't really work. The wheel uses a quick-path algorithm, so changes are always made as quickly as possible.

Color Wheel

Color change speed - adjacent	0.4 sec
Color change speed - worst case	0.8 sec
Maximum wheel spin speed	1.3 sec/rev = 46 rpm
Minimum wheel spin speed	171 sec/rev = 0.4 rpm

As with many of the features on the unit, there are a number of options in the software as to operation. The fixed color wheel can be put in a random mode where the color change is triggered by an internal microphone on the bass beat of music. This mode can be selected through a DMX-512 channel, and worked well.

Gobos

The ColorSpot has two gobo wheels, each containing six rotating/indexing gobos, with all gobos changeable, using the snap-in cartridge system mentioned above. As is becoming the norm these days, access to these comes through easily removable injection-molded plastic covers held on with quarter-turn fasteners; however, I would like to see safety cables on these covers.

Rotating Gobo (Both wheels identical)

Gobo change time, adjacent apertures	0.5 sec
Gobo change time, max (Gobo 0 to 3)	0.8 sec
Maximum gobo rotate speed	0.55 sec/rev = 109 rpm
Minimum gobo rotate speed	512 sec/rev = 0.12 rpm
Maximum wheel spin speed	2.7 sec/rev = 22 rpm
Minimum wheel spin speed	28 sec/rev = 2.1 rpm

Indexing and wheel-positioning accuracy on the rotating gobos is generally good. Measured hysteresis error is around 0.18° which is 0.75" at a 20' throw. Using the gobo-rotate channel gives smooth image rotation, with just a few signs of unevenness; however, crossfading between gobo-index positions produces hesitant, jerky rotations, which look like the internal motor velocity was set too high. A motor-speed option could significantly improve this. The whole wheel rotate suffers from similar problems at slow rotate speeds, with noticeable hesitations in the rotation.

Having two rotating gobo wheels gives the unit the opportunity to provide gobo-morphing by pulling focus between the two wheels and the ColorSpot performs well here. The physical separation between the gobo wheels is well-chosen to maximize the morphing effect. As to focus quality, Gobo Wheel 2 has a slightly better center to edge focus than Gobo Wheel 1, so I would choose Wheel 2 for any corporate logos or text (Fig. 12).

Both wheels suffer slightly with focus differences between one side of the image and the other. Taking a look inside, I believe this could be caused by the friction rollers, which provide dampening pressure on the side of the wheels (Fig. 13). This device does a good job of stopping the wheel from bouncing but it also pushes the wheel sideways by quite a distance on one side and, consequently, slightly affects the focus. The effect is small, however, and won't be seen in normal operation.

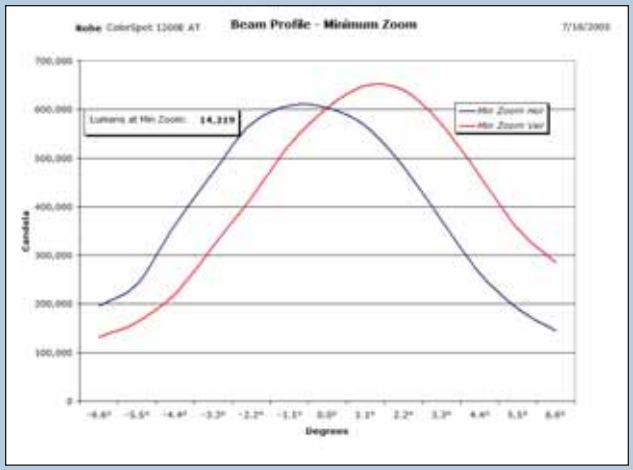

Fig. 15

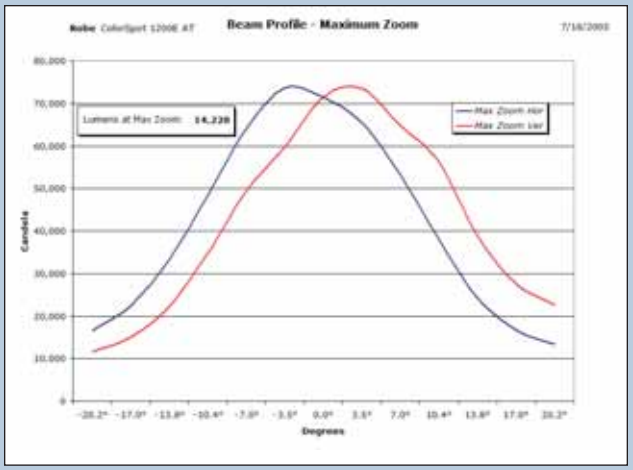

Fig. 16

Iris

The ColorSpot has a standard iris, which reduces the beam size to 14% of the full size when fully closed—i.e. 1.8° when at minimum beam angle and 6° when at maximum beam angle. Movement time, from fully open to fully closed, was measured at 0.8 sec. The iris control channel provides the full range of pulse and snap iris effects, most notably providing an iris/zoom link effect for maximum range of "pulse."

Effects

The effects wheel provides four effects as standard—three- and five-facet prisms, a linear breakup glass, and a diamond breakup glass. The compact optics don't allow for full image separation from the prisms but the effect still works well.

Effects Wheel

Effects change time (adjacent)	0.3 sec
Maximum spin speed	0.78 sec/rev = 77 rpm
Minimum spin speed	512 sec/rev = 0.12 rpm

The macros provided on the effects control channel are excellent and provide quick-and-easy access to 16 of the best effects combination of the factory-standard gobos and effects. This feature could be very useful in a live programming situation.

Frost

Twin frost flags provide the standard effect, frosting the whole field out to a wide soft edge. Time to open or close the flags was measured at 0.5 sec.

Lenses and output

The ColorSpot 1200E AT has a three-group projection-lens system: Groups One and Two both move, providing zoom and focus, while the final group is the static front lens. It looks like all groups are multi-lens achromatic combinations and, indeed, the result is very good, with very little chromatic and acceptable spherical aberration throughout the zoom range (Fig. 14).

Lens movement time from end to end was measured at 1.5 sec for focus and 2.75 sec for zoom.

The measured zoom range was 13° to 40°, or just better than 3:1, with the total lumens remaining very constant throughout the range at just above 14,200 lumens. The wide angle output is perhaps slightly at the low end of the range for this class of fixture, which is probably the penalty for having a large zoom range (Figs. 15 and 16).

This particular design of zoom requires overlap between the zoom and focus lens movement. As you focus in wider angles, the focus lens moves very close to the zoom lens and then the two move together as a pair to provide further focus range. This does cause some slight visible dynamic zoom shift and "hunting" when changing focus, which makes finding the sharpest focus slightly tricky. This effect is difficult to describe and is noticeable when programming but shouldn't be visible in playback except, perhaps, during slow gobo morphs.

Pan and tilt

The unit has a pan range of 530° and tilt of 280°. With the unit set to "track DMX," the fastest setting, a full-range pan move took 5.5 sec and a more typical 180° move took 3.4 sec. For tilt, the figures were 3.5 sec for the full range and 2.7 sec for 180°.

Positional repeatability accuracy on pan and tilt was extremely good, at 0.05° for pan and 0.09° for tilt—or around 0.25" at a 20' throw.

Mechanically, this is a very stiff system, with the usual compromises that we've talked about before in these reviews. A stiff system equals good accuracy and low hysteresis but also equals bounce when coming to a stop at high speeds. If that bounce worries you, just slow down your moves a little bit from the top speed and you get very acceptable results.

Both pan and tilt use large gear ratios in their twin belt-drive systems and both have good locking mechanisms for use when transporting the fixture. The tilt system is particularly elegant with a push button lock system (Fig. 17).

Fig. 17

Fig. 18

Fig. 19

Noise

Noise is one of this fixture's strongest features. With nine fans in the head, you would expect it to be very noisy—but that isn't the case. Robe does a good job of controlling the speeds of those fans and keeping them all at low noise levels. They have also mostly managed to avoid motor resonances, so there are no annoying whines. (Performing these tests means I have to turn off the air-conditioning in my workshop—not something I enjoy doing in Texas in July. However it's a sacrifice I'm prepared to make for the readers of *L&SA*!)

Sound Levels

Ambient	35.5 dBA at 1m
Stationary	49.5 dBA at 1m
Homing/Initialization	54.8 dBA at 1m
Pan	55.5 dBA at 1m
Tilt	54.3 dBA at 1m
Color	49.7 dBA at 1m
Effects	50.9 dBA at 1m
Gobo rotate	50.6 dBA at 1m
Gobo select	50.8 dBA at 1m
Zoom	56.6 dBA at 1m
Focus	64.0 dBA at 1m
Strobe	50.6 dBA at 1m

Electrical parameters

Power consumption at 118V, 60Hz

	Current, RMS	Power Factor
Electronics only, initializing	1.3A	n/a
Normal running	13A	1

Homing/initialization time

It's 44 seconds to complete a full "home" when the fixture is powered up and the reset command sent. I'm not sure if this is a bug or deliberate, but the fixture does not automatically black out when initializing, so the user has to remember to close the shutter before issuing the reset command, to avoid a spot of light wandering around the stage.

Electronics and control

The ColorSpot uses a distributed electronics system with main control and data input in the top-box and slave motor-drive boards in the head, connected via a serial data link (Fig. 18). As all the motor-drive boards are identical, this reduces the number and cost of spare parts a tour would need to carry and makes fault-finding easier. Robe has put a lot of effort into the fixture display and user interface (Fig. 19). Navigation through the comprehensive menuing system is simple, using the jog wheel and selection buttons. Interestingly, the jog wheel is actually a stepper motor driven backwards—it's a good choice, works well, and has a nice, tactile feel.

The menu system gives the user a huge number of options in the operation of the fixture. In fact, the combinations of options presented are almost bewildering. If the operator is using a modern control desk, then most of these settings can probably be safely left in their default positions and control relinquished to the desk where it should be. However, if you had to run the fixture from a very basic control desk, then these options could be useful. Suffice it to say that there is probably an option for everything you'd ever want to do.

Construction and serviceability

Layout and construction of the fixture is very straightforward—anyone familiar with moving lights will have no difficulty removing and replacing the basic components, such as color-mix modules, gobos, lenses, and circuit boards. Servicing this product in the field should present no problems. I removed and replaced the color-mix and gobo modules on my bench easily and quickly.

The Robe ColorSpot 1200E AT is up against some stiff competition at the top of the market but is certainly a strong contender. Which one should you choose? You decide…

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