Vari*Lite's VL3500 Wash

By: Mike Wood

Fig. 1: Fixture as tested

Fig. 2: Lamp access

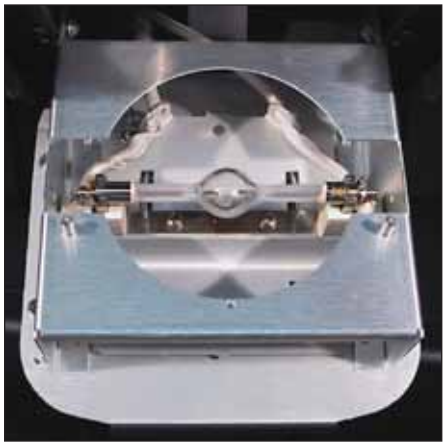


Fig. 3: Lamp change

With lower-wattage automated fixtures becoming a highly commoditized market, value-added manufacturers such as Vari-Lite have been swimming upwards in power into less populated waters. We've seen some large wash lights from a few of the upper-end companies and, in this issue, we are taking a look at one of them: The Vari*Lite VL3500 Wash. This is a large fixture with a large output, and such products need careful design if they are going to remain reliable. Throwing a 96lb. moving head fixture around quickly and accurately is not yet a trivial task. Comparisons with the High End Showgun are perhaps inevitable, as both fixtures have similar outputs. Such comparisons may be invidious, however, as the optical technologies used are different and, one assumes, their expected roles differ too.

The last 12 months have clearly been the year of the wash lights, so how does the VL3500 (Fig. 1) stack up?

In the wash light arena, Vari-Lite has been best-known for its parabolic units—the seminal VL5 and its more recent progeny, the VL500 range. The VL3500, however, is an ellipsoidal reflector unit broadly based around a design that has become the norm for automated washes and spots alike from many manufacturers.

As usual in these reviews, we will start at the lamp and work through the optical chain with measurements and descriptions presented as objectively as possible as we go. The results are based on the testing of one specific unit supplied to me by Vari-Lite as typical of the product.

All tests were run with the fixture operating on a nominal 230V 60Hz supply. The VL3500 uses switched mode power supplies for both lamp power and electronics. Because of the high power requirement, it is not possible to run the fixture on 115V, but the unit will run on supplies rated between 200-264V, 50/60Hz without any changes or switching. In my tests the unit consumed between 7 and 8A, depending on the motor load, 7.2A when stationary.

Lamp

The VL3500 has a couple of choices of lamps. The unit as supplied was fitted with an Osram SharXs 1500/D7/60. This is a 1,500W, 6,000K double-ended lamp with a CRI in the mid-80s. Vari-Lite tells me that a 7,000K lamp will also be made available from Osram in the future. Both are lamps from a well-known and successful range. Figures 2 and 3 show the large drop-down lamp access door and the lamp change system. It's a very straightforward mechanism, with all parts remaining securely captive at all times. The panel is held in place with four quarter-turn fasteners, while the lamp snaps in place with two fairly chunky spring clips, making lamp changes uncomplicated.

Next comes a very familiar cold-mirror faceted ellipsoidal reflector followed by a hot mirror (Fig. 4). However, here we start to see some features indicative of the large size of the fixture. Instead of the usual sheet-metal construction of the lamp house, the VL3500 has a substantial die-cast enclosure surrounded by a large counterweight to offset the huge pieces of glass at the other end—but more on that later. Figure 5 also illustrates the large, clear area surrounding the lamp house, which serves to isolate those 1,500W of heat from the optical components and the rest of the unit. It works well, and the fixture remained no more than warm to the touch during many hours of testing.

Strobe and dimmers

Right after the hot mirror can be found a pair of mirror-finish strobe flags. There's no need for subtlety with shaped or sawtooth edges, as these are used for strobing only;

dimming is elsewhere. The mirrored surfaces reflect the light and heat to the rear of the unit, but I suspect it's about protecting the strobe flags themselves rather than anything downstream; those flags would get awfully hot otherwise. These are large flags, but still manage to operate pretty quickly, with strobe speeds ranging from around 0.29Hz (one flash every 3.5 seconds) to around 12Hz.

Next is the dimming wheel. This is a large coated-and-etched glass wheel, more reminiscent of a color-mix wheel than anything else; in fact, it's the same size and shape as the CMY wheels further down the chain. Its construction is similar to a large glass gobo with a very fine gradient pattern. It performed excellently, producing an unblemished smooth fade down to black with no artifacts at any point. It's one of the best mechanical dimmers I've seen; it ranks up with some of the Clay Paky units for smoothness. The VL3500 also has a very nice dimmer curve (Fig. 6), with a flat "S" curve shape in between the linear and square law curves. This is a very usable dimmer.

Color systems

After the dimming flags comes a comprehensive color system. Vari-Lite has provided two fixed color wheels, each with five replaceable dichroics plus a four-color (cyan, magenta, yellow, CTO) color-mixing system. All these wheels are interleaved around a central aperture wheel with two color-mix wheels and a fixed color wheel on either side of the aperture. Figure 7 shows the overall setup. Looking at the color mixing first, it uses large etched dichroic wheels in a very conventional manner and gives respectably flat color mixing over a wide range of colors.

However, when looking at uniformity, I found a couple of points where there was a noticeable color difference across the beam, particularly with the cyan wheel. There is a transition where the wheel changes from the etched gradient to the full color area, and this can sometimes be visible and affect the uniformity. It was most noticeable mixing mid-to-deep greens when the beam was noticeably yellow on one side and green on the other. Because of this, I wasn't completely happy with the mixing of one of my test colors, aqua. The other two test colors that—peach and lavender—were fine. I don't want to be too critical of these points; in general, the color mixing was very good, with no other visible anomalies. The addition of a CTO wheel was useful for color temperature control and for mixing some subtle warm pastels.

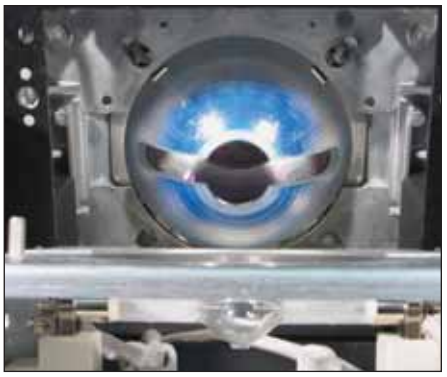


Fig. 4: Reflector

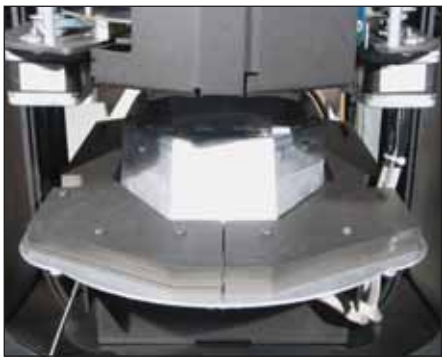
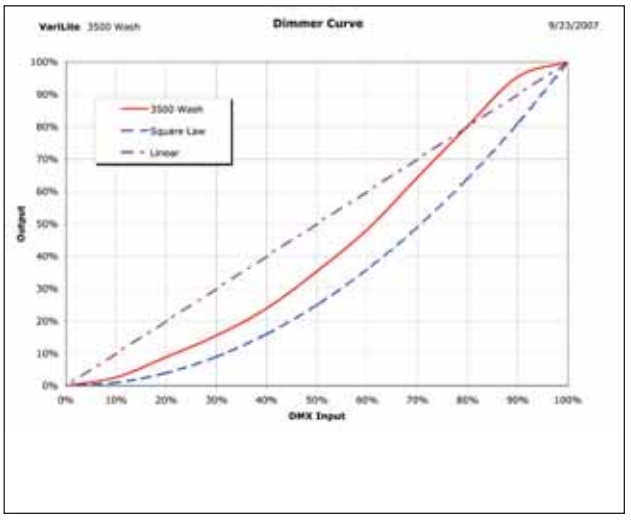


Fig. 5: Rear assembly



Color Mixing

Color	Cyan	Magenta	Yellow	Red	Green	Blue	CTO
Transmission	28.6%	12.4%	68.5%	9.6%	4.1%	2.7%	68.9%

Color change speed - worst case	0.5 sec

The choice of colors for mixing is slightly unusual, with a relatively unsaturated magenta that leads to slightly pale mixed reds and blues at the fully saturated mix end. You can see this in the transmission figures, where both cyan and magenta have relatively high transmissions. Vari-Lite may have done this deliberately to ensure good pastels where, indeed, the VL3500 performs very well. The fixed colors are much more saturated and provide the missing colors. Movement speed was good for such large wheels.

The two fixed color wheels use large trapezoidal filters, which are simple to change: They just snap in and out. The choice of colors, as mentioned above, is a good one to complement the color mixing-system and fill in any holes—this was the way to get my aqua! The transmission figures clearly show how much more saturated the red (2.5% versus 9.6% from the mixing) and blue (0.8% versus 2.7% from the mixing) are in the fixed colors.

Fixed Color Wheel 1

Color	Red	Yellow	Magenta	Aqua	Congo
Transmission	2.5%	80.2%	11.1%	15.4%	0.6%

Fixed Color Wheel 2

Color	Blue	Deep Straw	Fuchsia	Orange	Green
Transmission	0.8%	49.0%	1.7%	10.3%	30.8%

Color Wheel Speed

Color change speed - adjacent	0.5 sec
Color change speed - worst case	0.75 sec
Maximum wheel spin speed	.45 sec/rev = 133 rpm
Minimum wheel spin speed	190 sec/rev = 0.3 rpm

Again, the wheels are large, but Vari-Lite has done a good job of making the movement fast for the size, snappy color changes being one of the company's trademarks. The trapezoidal colors, with minimal gaps, made it possible to get some nice half-color effects, and all wheels use the quick-path algorithm—so changes from color to color are always as short as possible.

Aperture wheel

The aperture wheel is a slightly unusual addition to a wash light. It consists, as you might guess from the name, of a wheel with five differently sized apertures, ranging from 25mm to 52mm in diameter. These are presumably positioned at the focal point of both the ellipsoidal reflector and the output lens system, and thus provide beam sizing much like a spotlight. It is most effective when used with the clear PC output lens, as the diffusion provided by the standard stippled PC lens tends to spread the beam out and mitigate the effect. In that case, the aperture wheel just tends to act as an aperture stop or dimmer rather than a beam size control. However, with the clear lens, it performs as advertised and allows you to shrink the beam smaller than the zoom system can offer. Unlike the zoom, however, it does this by cutting light out as an iris does in a spot fixture, so the light beam doesn't get any brighter. I can certainly see where this might be useful sometimes. The aperture wheel was very quick to move and could snap between adjacent positions in less than 0.2 seconds, with a worst case between opposite apertures only increasing this to 0.3 seconds. You can also spin the wheel at speeds ranging from 3.75rpm to 133 rpm.

Lenses and output

The VL3500 has an interesting zoom system based around a two-lens-group setup. The rear lens travels back and forward to provide the main zoom behind a fixed output lens. What makes it unusual is that the rear lens can split down the center and open up like a pair of swing doors to get completely out of the light path. Figure 8 shows the sequence. Once the rear lens is open and out of the way, you essentially have a single lens group system with a very narrow angle. With an ear to the pun, Vari-Lite calls this the Vari*Brite system. Because the rear lens opens forward, you can only enter Vari*Brite mode when the rear lens is back and zoom is set to less than 60%. Any further forward and the opening lens would hit the front lens. Control of this lens opening is through its own DMX512 channel and stepper motor.

There are a number of replaceable options for both lenses, and all of the

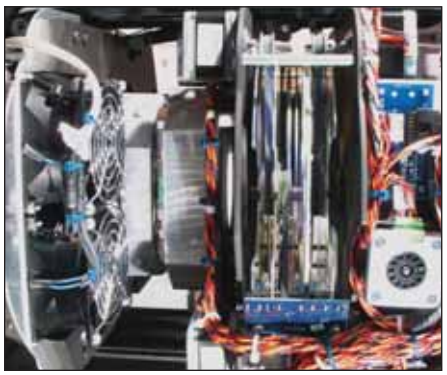


Fig. 7: Color section

Fig. 8: Vari*Brite lens

Fig. 9: Fresnel Vari*Brite lens

Fig. 10: Fresnel lens

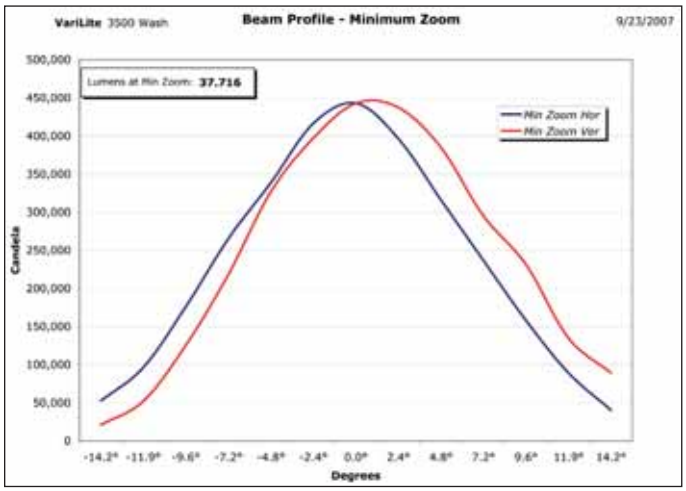


Fig. 11: Minimum zoom

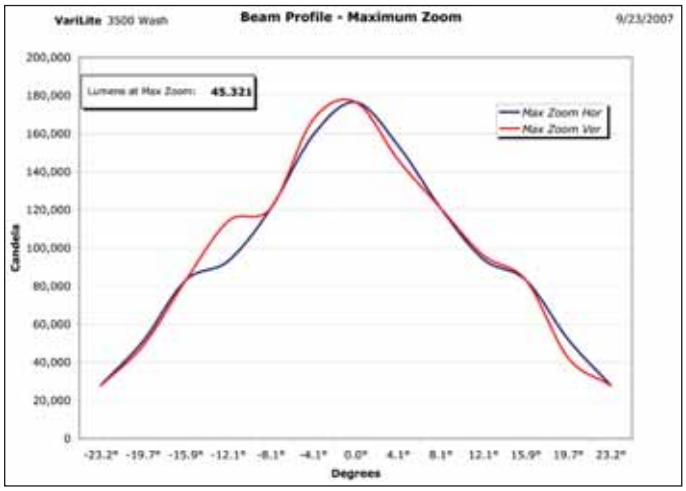


Fig. 12: Maximum zoom

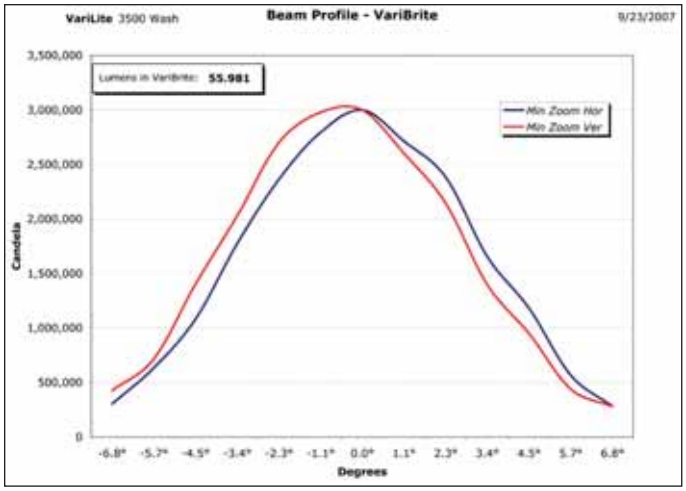


Fig. 13: Vari*Brite output

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There are a number of replaceable options for both lenses, and all of the currently available ones (three front and two rear lenses) are included and shipped with the fixture. The unit comes fitted as standard with a lenticular rear lens (as shown in Fig. 8) that Varlite call the "buxom," and a stippled PC front lens. As a point of information, as mentioned right at the beginning of the review, these front lenses have a relatively short focal length for their size, so they are very thick and heavy. I weighed the clear PC lens, plus its holder, at just over 10lbs., which is a lot of glass! Both lenses can be switched out, and changing the rear lens is fairly simple; remove two thumb nuts and the two lens halves slide off easily. Figure 9 shows the Fresnel Vari*Brite lens removed from the unit. The front lens is held in place with four captive socket head screws, and care needs to be taken in replacing it, because of its weight (Fig. 10). There are some small parts involved in changing either lens, so they are likely to be bench tasks, not things to do while the unit is in the rig.

The other supplied option for the rear lens is a Fresnel, and both a clear PC lens and a Fresnel are offered for the front position. In this review, I've measured the most common, standard combination of the buxom rear lens and stippled PC front lens.

In regular mode, using this combination of lenses, I measured

Fig. 14: Main panel

Fig. 15: Main board

the output as varying from 37,700 lumens at the narrow end, with a field angle of 28.5°, to 45,300 lumens at the wide end, with a field angle of 46.4°. Once switched to Vari*Brite mode, which effectively removes that rear lens, the output increased significantly to just under 56,000 lumens, with a field angle of 13.6° (Figs. 11, 12, and 13.). The Vari*Brite mode produces a tight beam that should show up well as an aerial effect. These figures are very good for a fixture in this class, and reflect the optical advantage of using lenses that are large compared to the source.

Pan and tilt

The pan and tilt range of the VL3500 are 540° and 250° respectively. A full-range 540° pan move took six seconds to complete, while a more typical 180° move took three seconds. Tilt took 4.3 seconds for a full 250° move and 3.4 seconds for the 180°. For the size of the unit, these are good speeds and the movement was excellent, with no wobbling or jerkiness. Final positioning was definite and precise, with extremely low hysteresis of 0.55° on pan and 0.11° on tilt. That's 0.2" at 20' on pan and .4" at 20' on tilt. This is very respectable for a spot unit, never mind a less critical wash.

Noise

Overall noise levels were reasonable; it's not the quietest fixture around, but that's likely not a problem in its target market. Zoom was the noisiest function, peaking at 58.5 dBA at 1m. The system also exhibited some whines from motor resonances at some speeds—most noticeably when spinning the aperture wheel—it wasn't that loud, but struck a very obvious note.

Sound Levels

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	49.8 dBA at 1m
Homing/Initialization	65.4 dBA at 1m
Pan	50.4 dBA at 1m
Tilt	50.0 dBA at 1m
Color	52.6 dBA at 1m
Aperture	56.5 dBA at 1m
Zoom	58.5 dBA at 1m
VariBrite	55.7 dBA at 1m
Strobe	50.9 dBA at 1m

Electrical parameters

Power consumption at 230V, 60Hz

	Current, RMS
Max when initializing	7.5A
Normal running	7.2A
All motors running	7.9A

The lamp is normally run at its rated 1,500W, but you have the option (through the menu and/or DMX512 control channel) of selecting reduced lamp powers of 1,200W and 900W from the same 1,500W lamp. These settings reduced output to 79% and 57% respectively—in other words, the reduction was pretty much directly proportional to the lamp power. Color changed very slightly at reduced power, but I saw no lamp flickering.

Homing/initialization time

Initialization took an average of 47 seconds from both cold and warm starts when the fixture was powered up and a "reset" command was sent. It also exhibits a problem I often seem to mention here—it reopens the shutter after a reset before the unit has finished returning to its final position. This results in an uncontrolled pan of light as the fixture returns to its preset. You may have noticed from previous reviews that this irritates me sometimes!

Construction

The VL3500 is very solidly constructed, with a lot of use of die-cast construction, as well as the more usual sheet metal. It's a large unit and needs some of that extra strength. The main body is easily accessible for changing dichroics or cleaning once you have removed the two large main covers but, for other work, you should note that it's not a modular unit and all maintenance really needs to be done back on the bench. That being said, all parts are relatively easy to access and I didn't see any real problems. I would perhaps have appreciated a yoke lock when I was trying to move it—that 10lb. lens swings about when you carry the unit. The main electronics board is in one yoke arm with very easy access, and the top box construction is very simple and gives straightforward access to both power supplies.

Electronics and control

Figure 14 shows the main inputs and control. The VL3500 has a nice simple menu system, with easy access to the main features. As mentioned above, the main electronics are in the yoke, and Figure 15 shows the single main board. Figures 16 and 17 show the low voltage power supply and lamp supply respectively, both manufactured by CCI. The VL3500 offers a comprehensive range of DMX512 and control features, including the Vari-Lite trademark timing channels on all motors.

That's it, the VL3500—a product very much in the Vari-Lite mold, solidly built and stable. As I said at the beginning, there are two or three fixtures in this power class right now, each offering

somewhat different features and functionality at the high-output end of the market. Is the VL3500 the one for you? You get to decide.

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Fig. 16: Low voltage PSU

Fig. 17: Lamp supply