



Fig. 1 - Fixture as tested

The Robe ColorWash 700E AT

By: Mike Wood

It's been 18 months since we last looked at a Robe fixture, so the time is ripe for another. This manufacturer from the Czech Republic has become a serious player in the market over the last few years, particularly in Europe. We've reviewed a number of wash fixtures recently, so we decided to continue the trend and take a look at one of Robe's newest entries in this field: The ColorWash 700E AT (Fig. 1). For quite a few years, wash lights seemed to be the poor cousins to the more exciting spots; as a result, new entrants into the market were few and far between. The VL5, Studio Color 575, and MAC 600 had become ubiquitous, but were all somewhat long in the tooth and starting to look their ages. Whether the manufacturers all simultaneously realized this or whether the spot market became saturated for a while, forcing them to look elsewhere for revenue, isn't clear. Whatever the reason, there's been a plethora of new wash fixtures over the last year—and we've seen innovation and improvement in this sector.

We've also seen the new wash lights fall into two distinct types—those based on parabolic reflectors, such as the High End Systems Studio Command and Vari*Lite VL500, and those based on ellipsoidal reflectors, like the Martin Mac 2000 Wash. The Robe ColorWash700E AT belongs to the latter category and is based around an ellipsoidal reflector similar, one assumes, to the company's spot units.

As always in these reviews, we 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 by the manufacturer as typical of the product.

The fixture used in the tests was run off a nominal 115V, 60Hz supply (measured at 118V at the fixture input). The fixture uses electronic auto-voltage selecting power supplies for both the lamp and the electronics and will run on any voltage from 100-240V, 50/60Hz. However, you are supposed to change the two 6.3A fuses to 10A (supplied) to run on 115V. I've seen this from a couple of manufacturers and, although it's understandable, I suspect these fuses often don't get changed until they've blown.

Lamp

The ColorWash 700E AT uses one of the increasingly common Philips' "FastFit" lamps, the MSR Gold 700 short arc (Fig. 2). This lamp base, developed jointly by Philips and Bender & Wirth, is ring-shaped, with a central hole that the lamp can pass through. This gives it the great advantage of a rear-access lamp change. That feature alone makes the new base design worthwhile in my mind. No longer does the whole lamp base, with its cabling, have to pull out of the rear of a fixture, nor do you have to grab onto the fragile and easily damaged lamp envelope to change the lamp. Instead, the socket stays put and, even more importantly, stays aligned to the reflector. Figure 3 shows what you see when you remove the rear lamp access plate, a simple twist-and-lock base that allows the lamp to be removed and replaced without disturbing anything. The base may look large when used with these small lamps, but it's worth it, in my opinion. The radial connector tabs are keyed, with one larger than the other, ensuring that the lamp goes back in facing the same way it came out. Again, this helps with accurate alignment, which is critical for best fixture performance with these short-arc lamps.

The lamp is surrounded by a completely standard cold-mirror faceted ellipsoidal reflector followed by a hot mirror. This lamp house assembly is thermally isolated as a separate sealed box with its own integral cooling, as can be seen at the bottom of Figure 4. I never measured more than 75°C on the outside of the fixture at any point, which is pleasantly cool.

Dimmers and strobe

Immediately after the hot mirror is a pair of dimmer/strobe flags (Fig. 5). There's nothing fancy here, just very basic metal flags. The wash optics are forgiving and homogenize well, so dimming was smooth throughout the range. The photograph also shows the hot mirror and faceted reflector quite clearly.

The ColorWash700E AT offers two different dimming curves, both of which are shown in Figure 6, along with the theoretical perfect square law and linear light law curves for comparison. The provided curves are pretty similar; both provide an "S" curve with

some minor differences in the middle of the range—not enough difference, to my mind, to make having two curves worthwhile. I'd prefer one of the options to be more of a square law, as shown on the diagram as a blue dotted line; hopefully, Robe will make a software change to improve this. However, on a positive note, both curves were smooth and there were no visible dimming artifacts at any point.

These same flags also provide the strobe system. Speed range goes from 0.27Hz (about one flash every four seconds) up to around 7Hz. It is also possible to strobe the lamp through the electronic dimmer with speeds up to around 30Hz. In this case, the lamp never goes completely out.

Color systems

Immediately after the dimmer flags are four pairs of flags (cyan, magenta, yellow, and CTO) for the color-mixing system. Robe has gone for something a bit different here—halfway between wheels and flags. Each color uses two large curved quadrant flags driven from a single motor through a gear system. The two flags are etched in a conventional deep sawtooth pattern and enter the beam from opposing sides (Fig. 7). The mechanism is nicely made and is smooth, quiet, and fast. The two quadrant flags overlap in the middle, thus avoiding the effect of the mixed colors coming into the beam from one side, which you occasionally see with wheels or single flag systems. The wash optical system is forgiving in this respect and helps make this a very smooth system. The only time I encountered some minor issues was when running at the widest angle, when there was some slight halation in a different color. For example, a mixed lavender had a slight magenta halo. This may have as much to do with the angle at which the light is going through the system as to any lack of homogenization.

Color Mixing

Color	Cyan	Magenta	Yellow	Red	Green	Blue
Transmission	15%	3.2%	76%	2.0%	5.4%	1.0%

Color change speed - worst case 0.3 sec

The figures above show that Robe has chosen some fairly saturated colors for its mix flags; however, I was able to mix my usual test colors (lavender, aqua, and amber) with no difficulties. These colors often show weaknesses in color-mix systems. The movement speed was very snappy for a color-mixing system.

Next in line is a small fixed lens, the first in the optical train. This is followed by a fixed aperture and then a color wheel (Fig. 8). As shown in the photograph, the color wheel has seven interchangeable colors, each held in place by a small, powerful magnet underneath the color. I found it very simple to remove and replace the colors using this system. Figure 9 shows a closer shot of a single filter.

The filters are mounted with slight gaps between the filters (Fig. 10), I don't know if this is a deliberate choice by Robe or not, as it lets some white light spill through when you stop the wheel on half-colors (Fig. 11). It's not really visible as a white streak, but it noticeably de-saturates the adjacent output colors as you go through it.

Fixed Color Wheel

Color	Dk Red	Dk Blue	Orange	Green	Amber	Yellow	UV
Transmission	2.4%	1.5%	38%	40%	12%	71%	1.2%



Fig. 2 - Lamp

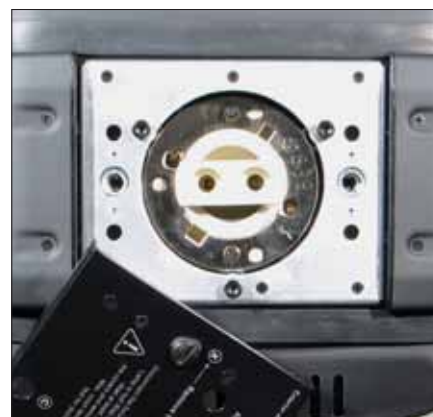


Fig. 3 - Lamp change



Fig. 4 - Optical module



Fig. 5 - Strobe and dimmer

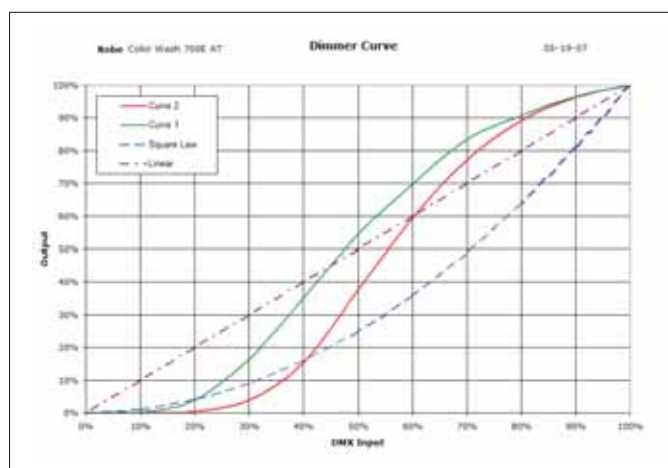


Fig. 6 - Dimmer curves

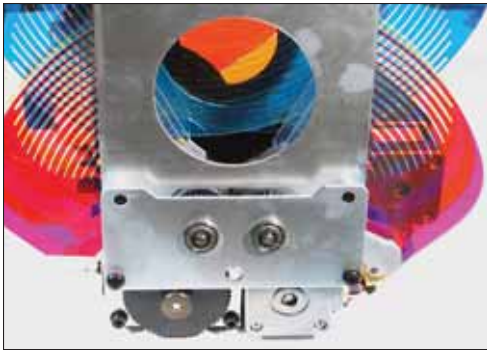


Fig. 7 - Color mixing

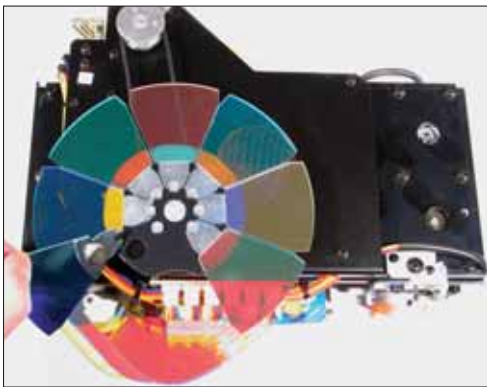


Fig. 8 - Color module

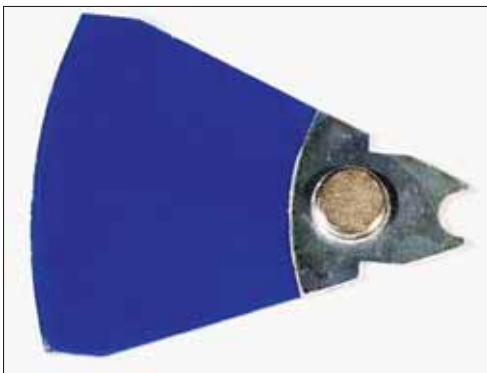


Fig. 9 - Color filter

Color Wheel

Color change speed - adjacent	0.2 sec
Color change speed - worst case	0.5 sec
Maximum wheel spin speed	1 sec/rev = 60 rpm
Minimum wheel spin speed	86 sec/rev = 0.7 rpm

The color-change speed was very snappy, and the wheel uses the quick-path algorithm, so moves are always as short as possible.

Lenses and output

The ColorWash 700EAT uses a fairly unusual optical system. There are three lenses; the first (the small lens before the color wheel) is stationary, as is the final 200mm diameter Fresnel lens. Between these, two is a large “fly-eye” compound lens, as shown in Figure 12. This lens has a hole in the middle, which is covered and uncovered by two pieces of frost glass as the lens moves forward. When it is fully back (in narrow angle position), the frost flags are open—and, as the lens comes forward and the beam angle increases, they close. This all happens over the first 30% of travel; in the remaining 70%, the lens, with its associated frost flags, moves forward to continue widening the beam.

Figure 13 shows the sequence from full spot and flags open (top left) to mid spot and flags closed (bottom right).

The net result of all this is a very tight beam (measured at 12° field angle) in spot mode when the light presumably mainly passes through the hole in the center of the lens. As you open up the angle and the frost flags close, you do see a transition in the beam pattern, but it’s not objectionable. At the other end of travel in wide angle, the frost and the compound

lens are spreading the light out considerably, giving a 39° field angle. I measured the output as 11,300 field lumens in narrow, increasing to 14,000 field lumens in wide. (Note: The unit was fitted with the standard front lens; Robe offers a wider angle lens as an option, but I did not have one to test.) These figures are about average for this class of fixture, the output in narrow is perhaps a little low while output in wide angle is good (Figs. 14 and 15).

Effects /beam shaping

The Robe ColorWash 700E AT has a single rotatable lenticular effect lens, which can be pivoted into the beam on an arm; this lens is clearly visible in Figure 12. As you can also see from Figure 12, the position of this lens is such that it can only enter the light path when the compound zoom lens is fully back, i.e. in its narrowest position. I suspect the effects lens system wouldn’t work when the frost flags are in place anyway. So, in narrow angle, you can bring the lenticular lens in and rotate it to get the familiar elliptical output. Figure 16 shows the system producing a horizontal and vertical beam. The lenticular lens can be indexed into a fixed position or can be rotated in either direction at varying speeds (Fig. 16). It took 3.5 seconds to insert or remove the effect and, once in place, it can spin at speeds varying from 1-60rpm.

Pan and tilt

The pan and tilt range of the ColorWash 700E AT is 530° and 280°, respectively. A full range 530° pan move took 4.2 seconds to complete, while a more typical 180° move took 2.6 seconds. Tilt took three seconds for a full 280° move and three seconds for the 180°. These speeds are good, and movement was very smooth. The unit tends to move very quickly up to the last few degrees, then slows down considerably for the last degree-or-so slide into the final position. This is fine for a soft-edged wash light where the beam edge isn't defined, although it might be more noticeable in a spot.

A plus of this behavior is the lack of bounce when stopping; this is a heavily damped system. The positional repeatability, or hysteresis, on both pan and tilt was around 1" of error at a 20' throw, or 0.22°. Figure 17 shows the tilt motor and tilt lock assembly in the yoke arm. Both pan and tilt use conventional designs for the drive systems, with large gear ratios and position encoding.

Noise

This is a pretty quiet unit for a discharge system. There was a high pitch whine at the upper limit of my hearing frequency range that I didn't manage to completely track down but I think came from the lamp power supply or ignitor. All motor movements were reasonably quiet, although I found a couple of resonances at medium speeds on pan and tilt that produced the highest figures given below. Fan noise was kept to a minimum by the thermal regulation system, which keeps the fans at as low a level as it can. The

noisiest component after pan and tilt was zoom, but that wasn't objectionable.

Sound Levels

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	43.0 dBA at 1m
Homing/Initialization	49.2 dBA at 1m
Pan	56.3 dBA at 1m
Tilt	51.4 dBA at 1m
Color	45.0 dBA at 1m
Zoom	49.5 dBA at 1m
Strobe	46.5 dBA at 1m
Effects	45.5 dBA at 1m

Electrical Parameters

Power consumption at 118V, 60Hz

	Current, RMS	Power Factor
Max when initializing	8.1A	0.95
Normal running	7.9A	0.98
Reduced power (when dimmed to 0)	4.77A	0.95

The lamp automatically enters a reduced power mode when dimmed to zero for more than three seconds, and bumps immediately back up to full as soon as you open the dimmer. I could see a second or so warm-up time as the lamp came back up to full power, but not enough to be a problem. In addition, the delay time is adjustable through the menu system and can be set to as long as ten minutes if you don't want the lamp to dim during short blackouts.

Homing/initialization time

Initialization took an average of 52 seconds from a cold start and a maximum of 40 seconds when the fixture is powered up and a "reset" command is sent. The

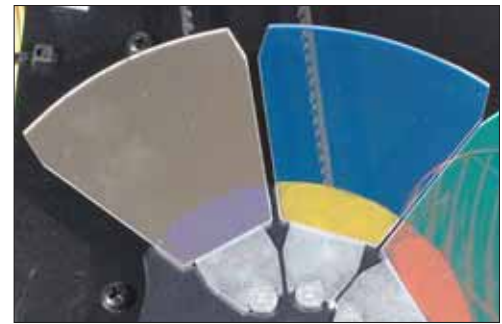


Fig. 10 - Gaps between colors



Fig. 11 - Half colors



Fig. 12 - Zoom and effects



Fig. 13 - Zoom sequence

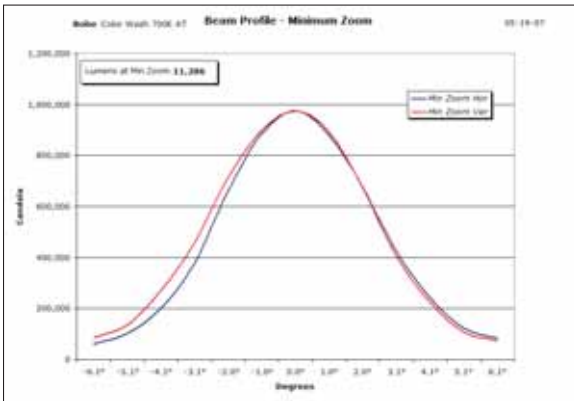


Fig. 14 - Minimum zoom

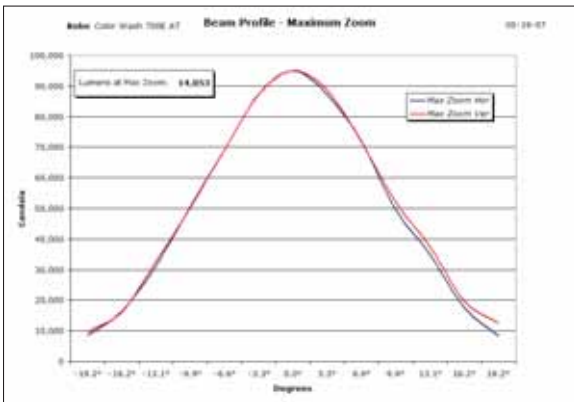


Fig. 15 - Maximum zoom



Fig. 16 - Beam shaping



Fig. 17 - Yoke arm



Fig. 18 - Display

unit shows a bug that many current products from various manufacturers seem to exhibit, in that it re-opens 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. To my mind, the shutter should not be reopened after a reset until the fixture has completely stopped moving.

Construction

The Robe ColorWash 700E AT has a very neat and tidy construction and should be simple to service. The color module (Fig. 8) was easy to remove—slacken two sliding catches, unplug some connectors, and it lifts right out. Once this is out of the way, you have clear access to all lenses and optical surfaces for cleaning. If you need to dig in a bit deeper, the front Fresnel lens is held with four quarter-turn fasteners and then lifts right off. This lens is fairly heavy, so it has a safety bond to keep it secured to the main body when the screws are removed. As mentioned earlier, changing colors is also a very straightforward process, and I'd have no qualms about changing them while the light was rigged.

The top box construction mirrors other Robe units and gives fairly straightforward access to the electronics and power supplies. Although this is all a bit more cramped than the head, there shouldn't be any problems in servicing the unit. Unfortunately, I don't have these units on test for long enough to evaluate reliability, but I saw no obvious problems during the few days I ran it.

Electronics and control

Figure 18 shows the menu and control system, which seems to be standard on Robe fixtures. It still amuses me that the rotary control is actually a small stepper motor driven backwards—it seems highly appropriate somehow. The menu and configuration system has all the usual functions you'd expect from a modern fixture.

As well as offering both five-pin and three-pin XLRs for DMX512 (with RDM ability), Robe offers the still slightly unusual option of an Ethernet port, which allows direct control through an Art-Net link. In addition, the fixture can act as a bridge between Ethernet/Art-Net and conventional DMX512 units, as it can convert and pass on the Art-Net signal as standard RS-485-based DMX512 through the XLR connectors to downstream fixtures.

As we said at the beginning, the Robe ColorWash 700E AT enters the market at a time when many other new wash lights are appearing. It's certainly an attractive unit, but does it have that combination of features, performance, and price to succeed in this highly competitive environment? You get to decide.

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