Coemar's Infinity Wash XL

By: Mike Wood

Fig. 1: Unit as tested

Fig. 2: Lamp

Fig. 3: Lamp change

Fig. 4: Lamp adjust

Fig. 5: Lamp house and optical assembly

Fig. 6: Color mixing in lens

We've reviewed a few large wash lights over the last year, and I've wanted to take a look at the Coemar Infinity Wash XL for a while. Logistics and timing never worked out but, finally, the stars between Italy, Florida, and Texas aligned and one arrived in my workshop for review.

Looking back, this is actually the first Coemar fixture I've reviewed. Coemar is a well-known Italian manufacturer with an extremely long pedigree in the automated lighting market. In 1984, the Coemar Robot was one of the very first automated units to be commercially available and, although the company didn't invent the concept, it was a truly seminal product, largely responsible for the burgeoning scanner market in the mid and late 1980s.

All that's history, of course, and Coemar, like many other companies, has gone through significant changes since those days. A few constants remain from the '80s; it is still in Castelgoffredo in Northern Italy; Fausto Orsatti still designs its products; and it still manufactures a wide range of units covering markets from discos to touring.

The Coemar Infinity Wash XL (Fig. 1) is definitely in the latter category—a 1,400W unit aimed at the top of the market. How does it stack up against the other players in that sector?

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. In this case, I was supplied with a well-used-and-seasoned demo unit, so it should be truly representative of real products in the field.

Although the Infinity Wash XL uses electronic switch mode power supplies, it isn't universal voltage, and the unit needs manual setting of a voltage selector. The ranges are rather narrow, with separate settings for 200/208V, 230V, and 240V (all 50/60Hz). The unit as supplied was set to 208V, which is the normal three-phase U.S. voltage found in industrial premises, including most theatres. However, in a U.S. domestic situation, like my workshop, the supply is actually two-phase, not three, so the intra-phase voltage is nominally 230V, which is more like the European standard. Accordingly, for these tests, I set the unit to its 230V setting.

As mentioned in prior reviews, the current crop of wash lights typically fall into one of two distinct types—gated units, using ellipsoidal reflectors, and full field units, using parabolic reflectors. The Coemar Infinity Wash XL is one of the former, an ellipsoidal unit with a gate.

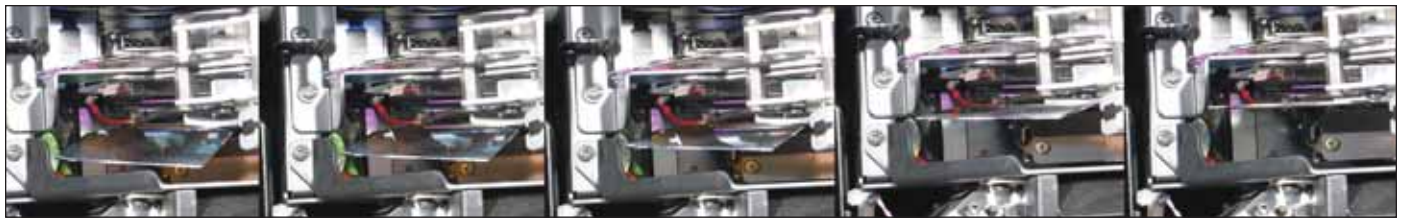

Fig. 7: Color saturation

Lamp

The Infinity Wash XL uses the Philips' MSR Gold 1200 SA/SE FastFit short arc lamp (Fig. 2). We've seen this new Philips/Bender & Wirth lamp style in a number of fixtures now, and I like it a lot; it makes lamp changes very simple, as there are no wires to mess with. You can also change a lamp while it's still relatively warm (with suitable precautions, of course). Figures 3 and 4 show the process. Removal of a single simple plate exposes the lamp base, and twisting the exposed ceramic allows simple lamp removal, with no exposure to live components. Insertion of a new lamp is just as easy, and the system provides good, positive alignment of the lamp. Surrounding the lamp is a cold-mirror ellipsoidal reflector, followed by a hot mirror. Slightly unusually for current units, this reflector is not faceted, but I saw no bad consequences. The whole assembly is enclosed in a lamp house (Fig. 5) with two fairly noisy blower-style fans keeping everything cool. I had no temperature problems during my tests. The lamp power is electronically controllable from 800W - 1,400W, but all tests were run at the default 1,400W setting.

Color systems

First in line after the lamp house are the color-change systems. Color mixing comes first, followed by a fixed color wheel. The Infinity Wash XL uses four sets (cyan, magenta, yellow, and CTO) of fairly conventional color mixing flags—but with a novel twist we'll come to in a moment. Firstly, the conventional: Each of the four colors has two large curved etched flags driven from a single motor through a gear system, which opens and closes across the aperture from opposing sides. These flags have a familiar gradient pattern etched into the dichroic coating and overlap as they move, increasing the effective movement range. The mixing was smooth and consistent; the only time I saw unevenness was with the magenta flag at very narrow beam angles, where I could see a center-to-edge color difference. Look at the output lens while changing color and you can clearly see the mechanism at work (Fig. 6). Note you cannot see the effect of this in the projected beam; as always with a wash fixture, the output optics and lens pebbling help, and everything homogenizes after the output lens.

Fig. 8: Half colors

Color Mixing - Default Saturation

Color	Cyan	Magenta	Yellow	Red	Green	Blue	CTO
Transmission	26%	2.9%	75%	2.5%	19%	0.2%	40%

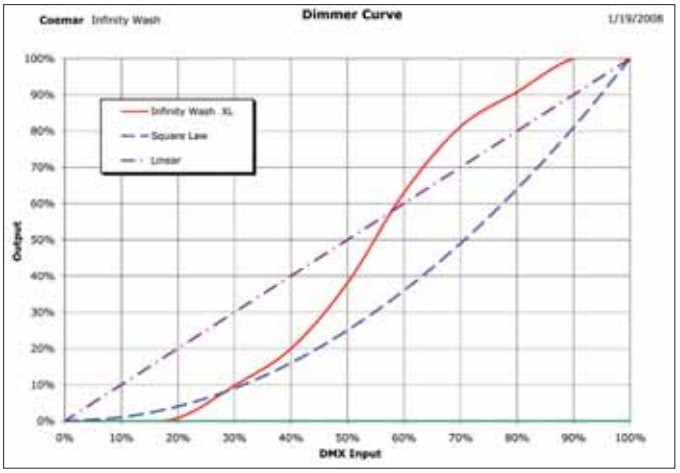

Fig. 9: Dimmer curve

Color change speed - worst case	0.5 sec

All the flag colors are fairly saturated, but I was still able to mix my usual test colors (lavender, aqua, and amber) with no real problems. I found the yellow was a bit "limey" for my taste, but it didn't cause significant problems. The color mix flags are quite large, so it's never going to be the quickest color-mixing system.

I measured the CTO with a color temperature meter, as giving a range from 6,800K (no filter) down to 3,190K (CTO fully inserted). This will vary between lamps and as the lamp ages.

Now, the unconventional aspect of the color-mixing system that I mentioned earlier: Coemar has added another motor to each of the magenta and cyan mechanisms, which allows the whole flag assembly to tilt towards and away from the perpendicular by a few degrees. We know from the tilting systems used in other manufacturer's products that angling dichroics like this causes a change in saturation and color of the transmitted beam. Coemar uses it to allow one to control the saturation of these two colors in the mix in addition to the normal flag mechanism. Figure 7 shows a sequence of photographs, as one of the flags moves from its default saturation (angled away from the perpendicular) to maximum saturation (perpendicular to the light beam). This allows the user to select a color mix using the normal flags, and then increase the saturation, as desired, of the cyan and magenta flags. Coemar has chosen to mix less-saturated colors using the standard flag-rotation mode, and then to allow the user to get to the more saturated levels using the supplemental tilting mechanism when they need them. The tilting provides the top 15% of the cyan range and 20% of the magenta, and allows you to get noticeably deeper reds and blues out of the system when you need them.

With the saturation adjustment channel at maximum, the transmission figure, which gives you a good indication of the change in the color saturation, dropped from 26% to 22% for cyan, while magenta went from 2.9% to 2.2%—a useful and noticeable change in both cases.

Next in line is the color wheel, this has five replaceable circular colors plus open white, and is fitted as standard with the usual selection of commonly requested and hard-to-mix colors.

Fixed Color Wheel

Color	**Lavender**	**Yellow**	**Green**	**Red**	**Blue**
Transmission	68%	61%	44%	2.1%	4.8%

Color Wheel Speed

Color change speed - adjacent	0.2 sec
Color change speed - worst case	0.6 sec
Maximum wheel spin speed	0.63 sec/rev = 95 rpm
Minimum wheel spin speed	203 sec/rev = 0.3 rpm

The colors are fairly close to each other, so it is possible to get half colors out of the system. (One of the main uses of color wheels in a color mixing systems; see Figure 8.)

The color-change speed was good for a large unit and the wheel uses the quick-path algorithm, so moves are always as quick as possible.

Dimmers and strobe

Immediately after the color-change systems is a pair of standard flags providing strobe and dimmer functions. It's all fairly basic, but nothing more is required, as wash optics are typically very forgiving. Dimming was smooth throughout the range, with no beam artifacts, but there was some noticeable "irising" of the beam, particularly at the narrower beam angles.

The Infinity Wash XL has a slightly discontinuous dimming curve shown in Figure 9, along with the theoretical perfect square law and linear light law curves for comparison. The dimmer has a somewhat S-shaped curve, with dead bands at the top and bottom between 90-100% and 0-18% where nothing changed, thus reducing the effective resolution. It's clearly not the best dimmer curve, but it's smooth enough that this reduced resolution isn't likely to be a problem.

The mechanical strobe system gives a speed range from 0.85Hz up to around 9Hz. It is also possible to strobe the lamp through the electronic dimmer in "zap" mode to higher speeds. As with other units that use this technique, when using "zap" mode the light output is never completely extinguished.

Note: I've been asked by a reader how I measure strobe rate. High speed strobes are certainly too fast for a stopwatch! It's actually pretty straightforward: I made a probe for my oscilloscope with a small solar cell from Radio Shack and just shine the light at it. With the Coemar Infinity Wash XL I got the result shown in Figure 10, where you can see the strobe light output and can read off the frequency, 8.948Hz. The actual output level is irrelevant—all that matters in this case is the frequency.

Effects/beam shaping

Next in the optical train is one of the elements of the zoom lens, followed by the effects wheel. The Coemar Infinity Wash XL has four rotatable effects on this wheel, plus an open hole. The wheel, as can be seen in Figure 11, has a lenticular beam-shaping prism, a three-facet prism, an offset prism, and a tricolor dichroic; they're all very different effects. The whole effects wheel carriage, along with its zoom lens element, moves axially in the unit as the zoom angle is changed.

Starting with the lenticular beam shaping, the effect and amount of shaping is subtle. Figure 12 shows the output beam with the lenticular beam in two positions: horizontal and vertical, 90° apart. The effect is noticeable in the narrow angle "zoom-effect" range from 9°-15°, but is almost imperceptible in wider angles. The two prisms have more divergence than the beam shaping and are unusual, but interesting, items to have in a wash light; Figure 13 shows the three-facet prism with the fixture at its

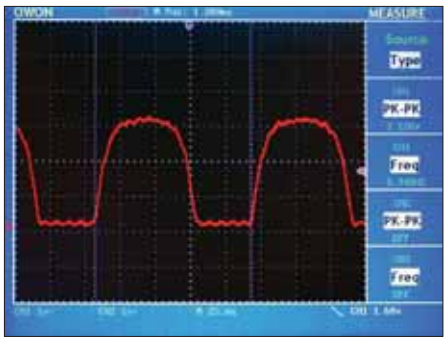

Fig. 10: Measuring strobe rate


Fig. 11: Effects wheel


Fig. 12: Beam shaping


Fig. 13: Prism


Fig. 14: Tri-color


Fig. 15: Zoom

narrowest angle. Finally, Figure 14 shows the tricolor dichroic at narrow angle—this effect is usable and noticeable at wider angles. All effects can be set to an indexed position, or continuously rotated in either direction at varying speeds.

Lenses and output

The Infinity Wash XL has a two/three-element zoom lens system. The first lens is a moving plano-convex lens mounted on the same moving carriage as the effects wheel. The next lens in the train is a slightly unusual moving Fresnel lens, and finally there is the large fixed Fresnel output lens. Both the effects wheel, with its fixed lens, and the smaller Fresnel lens move axially to provide the zoom function. However, the small Fresnel has another trick up its sleeve; it's split down the middle into two semicircular segments, which close like a pair of curtains as the lens moves forward. Figure 15 is a sequence of photographs showing the entire range. When the small Fresnel lens is fully back, and the fixture is as narrow as it can go, the two halves are fully separated and completely out of the beam. Effectively at this point, we have a two-lens system—rear effects wheel carriage-mounted lens plus output Fresnel. This gives a very tight, narrow 10° beam. As you increase the level on the zoom channel, the small Fresnel closes down and starts to move forward. At that point, we have a three-element zoom, which zooms out all the way to a very wide 78°. The fixture behaves very differently in each mode; the transition between the narrow angle (two-element) and regular (three-element) modes is fairly abrupt, and it's almost like having two different units—a very narrow beam unit when the Fresnel lens is split and a more conventional (but very wide angle) wash when it's in.

I measured the output at just under 29,000 field lumens in narrow angle, reducing to 23,250 field lumens in wide. Fixtures are typically more efficient in wide angle, but the closing of the small Fresnel lens effectively adds another optical element at that point, and inevitably causes some loss in output.

These light output figures are about average for this class of fixture with the zoom range, and good for a unit with such a large zoom range (Figs. 16 and 17).

The Infinity Wash XL also gives the user the option of running the zoom without closing the Fresnel lens—i.e. locked in two-element mode. Coemar calls this "zoom effect" and it gives a much more limited zoom at the narrow end of the range, from 10° to 15°. The advantage here is that all the effects—prism, lenticular, etc.—operate fully over this range. In this mode at 15°, I measured an output of 25,500 lumens.

Pan and tilt

The pan and tilt ranges of the Infinity Wash XL are 540° and 250° respectively. A full-range 540° pan move took 6.6 seconds to complete, while a more typical 180° move took 4.25 seconds. Tilt took 5.1 seconds for a full 250° move, and 4.25 seconds for the 180°. These speeds are slightly slow for the class. Overall, the movement was smooth and accurate, but I did see a lot of settling bounce on tilt—pan was fine.

It's the usual trade-off; a stiff system with bounce is usually very accurate, and that is indeed the case here. The positional repeatability or hysteresis on pan was an excellent 0.4" of error at a 20' throw, or

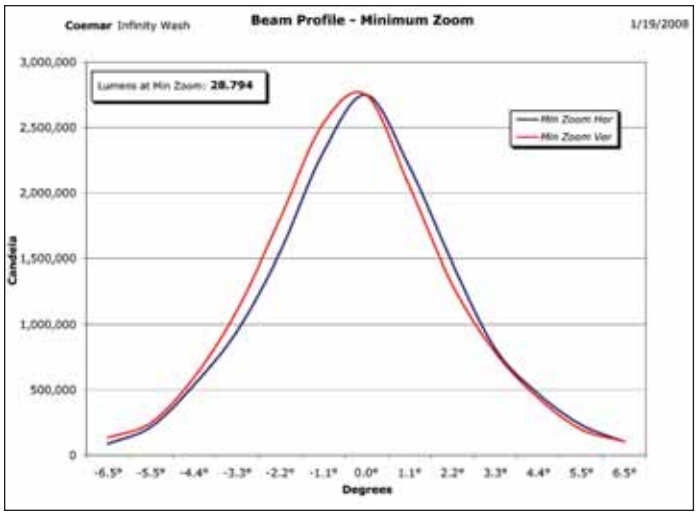

Fig. 16: Minimum zoom

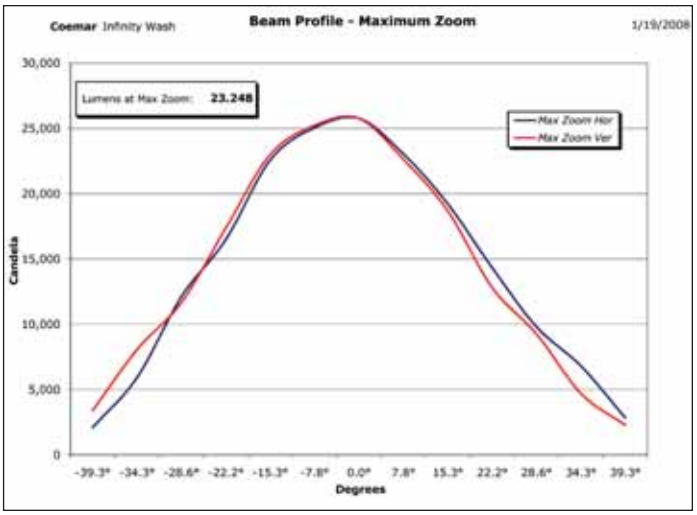

Fig. 17: Maximum zoom

0.09°. Tilt was a little worse, but still very good, with 0.8" of error at 20' or 0.18°.

Both pan and tilt have manual locking systems for transport and maintenance, which worked well.

Noise

This is not the quietest of fixtures, by any means. The two blowers cooling the lamp are pretty noisy, and there was significant motor whine, particularly from zoom and tilt. In many of the figures below, the fan noise overshadows any motor noise. Although I didn't test it, Coemar tells me there is an optional quieter operating mode for the fans. If your market is a concert tour, this probably won't be too much of a problem.

Sound Levels

	Normal Mode
Ambient	<35 dBA at 1m
Stationary	56.1 dBA at 1m
Homing/Initialization	59.7 dBA at 1m
Pan	56.4 dBA at 1m
Tilt	60.9 dBA at 1m
Color	56.1 dBA at 1m
Zoom	59.8 dBA at 1m
Strobe	58.2 dBA at 1m
Effects	56.1 dBA at 1m

Electrical parameters

Power consumption at 230V, 60Hz

	Current, RMS
Max. when motors running	7.5A
Normal running, stationary	6.8A

It is possible to control the output of the lamp by controlling the electronic lamp power supply through a DMX512 channel. I measured the range of adjustment as from 58% to 100% full output. This corresponds with the 800-1,400W that Coemar claims. The supply and lamp was very responsive to these changes in power, with little or no flickering as the lamp powered up and down. Inevitably, I saw some slight changes in color temperature as power varied.

Homing/initialization time

Initialization takes an average 41 seconds when the fixture is powered up and a "reset" command is sent, and I'm delighted to report that the Infinity Wash XL, unlike many units I've tested recently, behaved properly after a reset, and didn't open the shutter until all motors had reached their programmed positions.

Construction

Construction is neat and tidy, with the electronics distributed between the top box and one of the yoke arms. All the drivers for the head functions are in a yoke arm (Fig. 18), while the pan and tilt drivers and DMX512 electronics are in the top box next to the display and control panel (Fig. 19). Access to the boards in the yoke arm is particularly easy; each arm cover is held on with four captive quarter-turn fasteners. Getting into the top-box was slightly trickier; although the same quarter turn fasteners are used, it was tricky to extricate the covers from the yoke and each other. I'm sure there's a knack to it, but I clearly didn't have it! Once inside, there's easy access to the lamp power supply and other power electronics (Fig. 20). The lamp power supply itself states to be of Coemar manufacture; I didn't open it to see if it was a rebranded supply from one of the major lamp supply manufacturers.

The other yoke arm contains the tilt motor and the lamp ignitor (Fig. 21); again, these are all very easy to access. Finally, the main head has the usual easily removable covers and, once you are in

Fig. 18: Drivers in yoke

Fig. 21: Ignitor

Fig. 19: Main PCB

Fig. 20: Lamp PSU

Fig. 22: Display

Fig. 23: Inputs

there, the whole color and dimmer module can be removed with two screws. This should be a straightforward unit to maintain and service.

Electronics and control

The Infinity Wash XL has a very familiar control panel and menu system, allowing the user access to all the standard settings and information through a conventional seven-segment display and four-button control (Fig. 22). For DMX512, the Infinity offers both five-pin and three-pin XLRs (Fig. 23) as well as a proprietary RJ45 connector for connection to a Coemar DR1 device for remote access to the menu functions. (Although, in the unit I tested, I noticed that this was a dummy and there were no connections internally from this connector).

The Coemar Infinity Wash XL enters a busy sector of the market, as the “super zoom” washes make up a popular category. It clearly offers a couple of novel features with the narrow beam mode and the variable saturation color mixing. Enough features to sway you? As always, you get to decide.

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