Ayrton GHIBLI

By: Mike Wood

Figure 1: Fixture as tested.

I've reviewed a number of Ayrton products before, but they've always been from the "Creative Solutions" range of automated, LED-based pixel and pixel array products, which have found a place in many lighting rigs, providing effects and background. However, with the recent changes in Ayrton's management, the company is now moving into more conventional automated lighting. It's a larger market, but one with much more competition. It will be very interesting to see how this strategy progresses.

This month, we are looking at the GHIBLI, a white, LED-based automated profile spot and the first product from Ayrton with framing shutters.

I was provided with a unit for review by A.C.T Lighting, the US distributor of Ayrton products. Everything I report is based on the tests on this single, typical, unit. All tests were run on a nominal 115V 60Hz supply (tests run at 118V); however, the unit is rated to run on voltages from 110V – 240V 50Hz/60Hz. (Figure 1). The tests reported below step through the unit from light source to output lens, measuring as much as I can as I go.

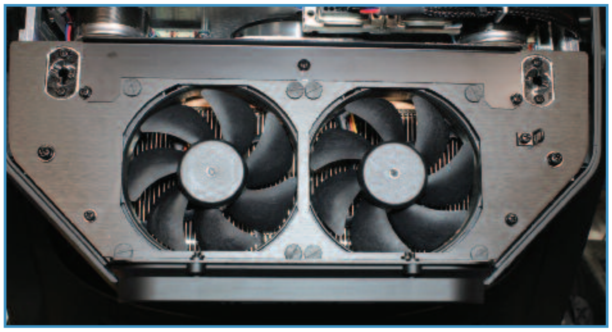

Figure 2: Heat sink and fans.

Light source

The light source in the Ghibli is a familiar-looking design that, I believe, is from Appotronics. It contains an array of high-power white LEDs topped with a fly-eye lens array that directs each LED through the gate. Figure 2 shows the rear of the unit with the fans, heat sink, and, at the top of the photo, the small silver light engine. The heat sink is a large copper plate affixed to the rear of the light engine, with heat pipes conducting that heat to a set of aluminum fins. Two thermostatically controlled fans pull air across those fins, in at the bottom of the head, and out of the top.

Color

All major systems in Ghibli are mounted on two removable modules. The first module in the optical train, right after the light engine, contains both color and gobo systems. First in line are dichroic glass color-mixing flags. In common with other manufacturers, Ayrton employs a pair-of-curtains system in which each of four sets of graded dichroic colors (cyan, magenta, yellow, and CTO) come in as two plates, one from each side of the beam. Each plate is cut and etched with a graded pattern, helping with the smoothness of the mixing. Figure 3 shows the rear of the module, with one pair of plates, magenta, clearly visible partway across the aperture.

I measured the output from the color-mixing system as follows. The colors are reasonably saturated (less saturat-

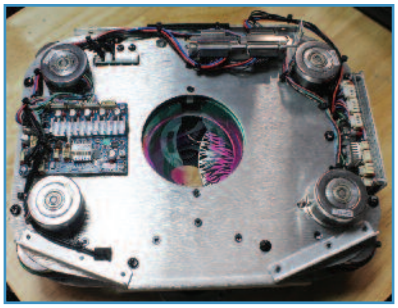

Figure 3: Color gobo rear.

ed than a concert lighting unit, more typical of a theatrical light), and I was able to mix good, even colors. There was some slight color difference between center to edge with aquas and lavenders, but, overall, very clean.

COLOR MIXING

Color	Cyan	Magenta	Yellow	Red	Green	Blue	CTO
Transmission	16%	9%	72%	7.9%	3.3%	0.3%	35%

When inserted fully, the CTO flags reduced color temperature from a native 6,694K down to a CCT of 2,881K. Looking at color rendering, at 6,694K the TM-30 values were Rf = 76 and Rg = 92 (CRI Ra 77), and at 2881K TM-30 values were Rf = 74 and Rg = 94 (CRI Ra 71).

Next in line is a CTB filter. It comes in automatically whenever a gobo on either wheel is selected. This counteracts the lowering of color temperature that you see in profile spots when a gobo is inserted. This is partially from the glass and partially an optical effect from the reduced apertures. The net effect is that, when a gobo is used, the color temperature remains visibly constant, but it drops the light output by about 30%. The user can choose to enable or disable the use of this filter though the configuration menu or DMX control channel. This is followed by the fixed color wheel, which has six trapezoidal dichroic colors, including a high CRI filter and open hole.

FIXED COLOR WHEEL

Color	CRI	Congo	Green	Amber	Pale Blue	Red
Transmission	74%	0.5%	18%	25%	5.3%	2.3%

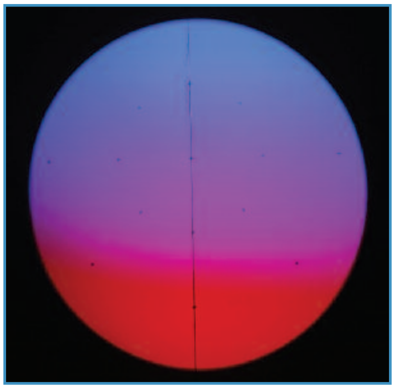

Figure 4: Half colors.

The trapezoidal shape means you can make half colors with almost no bar between colors, although the transitions are inevitably a little fuzzy, being so far from the focal plane. Figure 4 shows an example of one of the half colors, between pale blue and red. Color change speed was good, with very smooth transitions and slow wheel rotations possible.

COLOR SYSTEMS

Color change speed – adjacent	0.1 sec
Color change speed – worst case	0.4 sec
Color mix speed – worst case	0.7 sec

The high CRI filter is effectively a minus-green filter that knocks out the big green spike you get with white LEDs and improves the overall mix. You can't improve the red with a filter (which is what is really needed) but you can drop everything else so that the red you have gains in importance. When inserted, it dropped the light output by about 25% but raised the color rendering. With it inserted at the native color temperature (no CTO filter), TM-30 values went up to Rf = 83, Rg = 99 (CRI Ra 88) while the color temperature dropped slightly down, to 6,391K.

Imaging effects

On the other side of this module we get the gobo and animation wheels. Figure 5 shows this side. Visible in the photograph are the rotating and fixed gobo wheels, with a cooling fan at the top; the animation wheel is hidden behind the fixed wheel on the right.

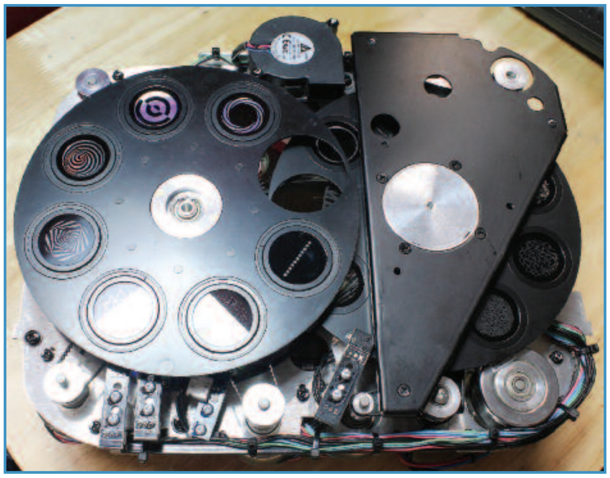

Figure 5: Color gobo front.

Working through, the first effect is the animation wheel. This can be inserted or removed from the beam in about 0.5 seconds; it allows a wide range of rotation speeds. The angle of the rotation axis cannot be changed.

Next come the two gobo wheels, both of which are populated with glass gobos. The rotating wheel has six rotating, indexing gobos plus an open hole, while the fixed wheel has seven gobos plus open hole. As is the norm these days, the gobos are mounted in snap-in cartridges to make for a quick and easy change. Figure 6 shows one of the rotating gobos; the fixed are similar.

Figure 6: Gobo.

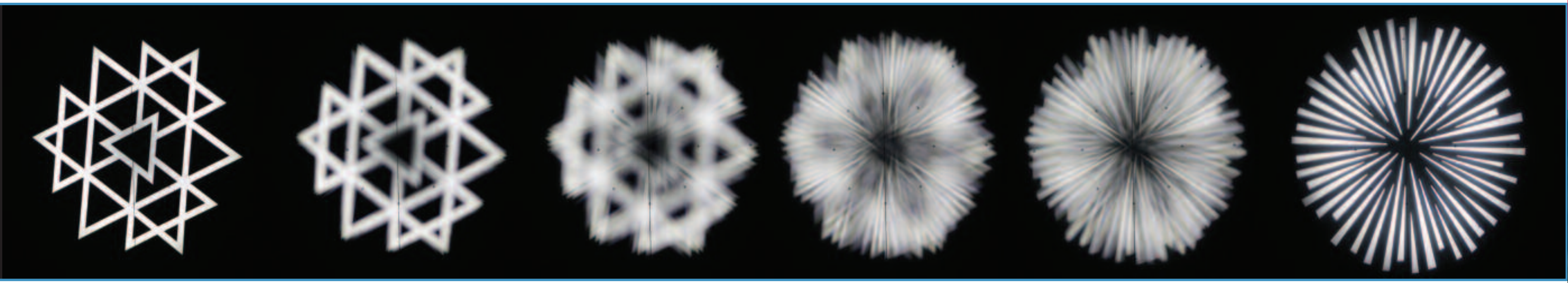

Figure 7: Gobo morph.

ROTATING GOBO	
Gobo change speed – adjacent	0.3 sec
Gobo change speed – worst case	0.8 sec
Maximum gobo spin speed	0.25 sec/rev = 240 rpm
Minimum gobo spin speed	214 sec/rev = 0.28 rpm
Maximum wheel spin speed	0.81 sec/rev = 74 rpm
Minimum wheel spin speed	168 sec/rev = 0.4 rpm
FIXED GOBO	
Gobo change speed – adjacent	0.2 sec
Gobo change speed – worst case	0.6 sec
Maximum wheel spin speed	0.68 sec/rev = 88 rpm
Minimum wheel spin speed	168 sec/rev = 0.4 rpm

Positioning and rotation of both wheels was quick and smooth, with a good range of rotation speeds. The rotating wheel showed some bounce when changing direction; I measured the accuracy as 0.38° of hysteresis error, which equals 1.6" at a throw of 20' (67mm at 10m). Both wheels use a quick-path algorithm to minimize change times.

Focus quality on all gobos was excellent, with very acceptable edge-to-center difference and almost no color fringing. Figure 7 shows an example of the gobo morph effect from the rotating wheel to the fixed.

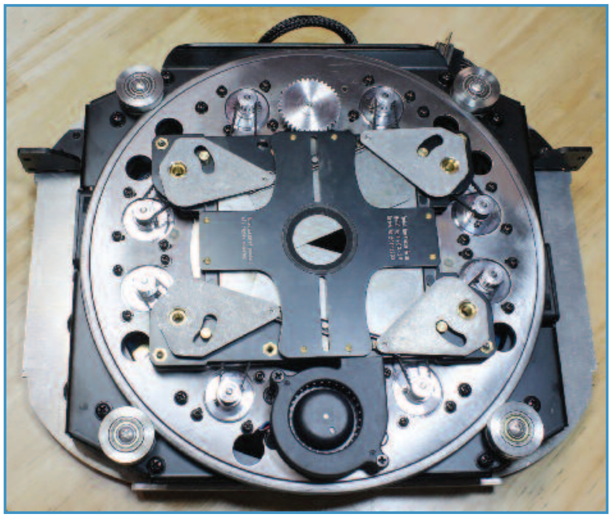

Figure 8: Framing front.

Framing

Next is the second module, with the framing system and iris. Figure 8 shows the front of the module and top two blades; the other two blades are beneath these. Each is driven via two motors, belts, and a three-bar linkage to give control over blade rotation and insertion. Each blade can be tilted approximately 22° in each direction at the center of the beam (45° in total) and can travel fully across the beam. The available variation in angle varies with insertion: maximum when just inserted and minimum, zero adjustment, when fully across the beam. Figure 9 shows two opposing blades, each tilted toward each other by their maximum amount. It also gives an idea of the small focus difference between the blades. Finally, as usual with these systems, the entire framing mechanism can also be rotated by +/-45°.

I measured a maximum of 0.6 seconds to move a blade into position across the beam. The blades exhibit a hysteresis in position of approximately 0.19°, which equates to 0.8" at a 20' throw (33mm at 10m)

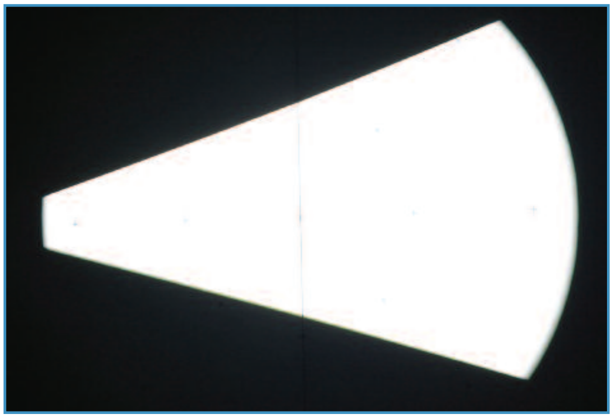

Figure 9: Framing.

Iris

Turn this module over, as shown in Figure 10, and you get to the iris. I measured its opening/closing time at 0.3 seconds. The fully closed iris reduces the aperture size to 17%

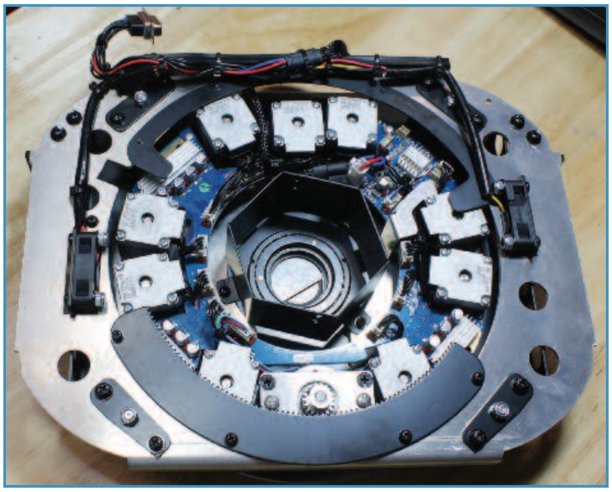

Figure 10: Framing rear.

of its full size, which gives equivalent field angles of 1.3° at minimum zoom and 8.1° at maximum zoom.

Prism and frost systems

The Ghibli has two frost flags and a prism, all sharing the same slot immediately after the first group of lenses and riding back and forth with those lenses. Both frosts can be inserted together but cannot be inserted at the same time as the prism. This frost flags, one light and one heavy, can be inserted or removed in 0.3 seconds. As is so often the case with automated profile units, when partially inserted the effect is that of a contrast reducer, not a frost. It acts as a true frost with softened edges only when fully inserted. I've been asked about this problem recently, as I've mentioned it before in many reviews; I wanted to document more clearly what I mean. Figure 11 shows what happens to a gobo as the light frost is brought across the beam, while Figure 12 does the same for the heavy frost. Note that both do a great job of diffusing the image when they are fully inserted, but at in-between positions the edges of the gobo remain sharp and the effect is limited to an increase in brightness of the background.

Even though I don't like it, I can't really blame Ayrton, or any other manufacturer who has a frost that work like this. It's a fundamental problem with trying to make a frost variable. If you insert a color filter partway across a beam you can homogenize that color reasonably well across the whole beam; white + color = paler color. With frost, however, if even a small portion of the beam is unfrosted, then the sharp-edged images coming through that portion will end up on the stage. All that will happen is the intensity of the sharp-edged portion will vary with the amount of the image that is frosted. It behaves more like a video crossfade between the unfrosted and frosted images, not the desired defocusing effect. In theory, with three group optical systems like this, there is a single pupil plane right after group one where all the light passes through a single point and variability should be possible. In reality, however, there isn't a single plane—this is a zoom system, after all—and it's not a single point. Manufacturers put the frost in the best place they can, but it's never 100% correct.

Sharing that same pupil plane is the five-facet prism,

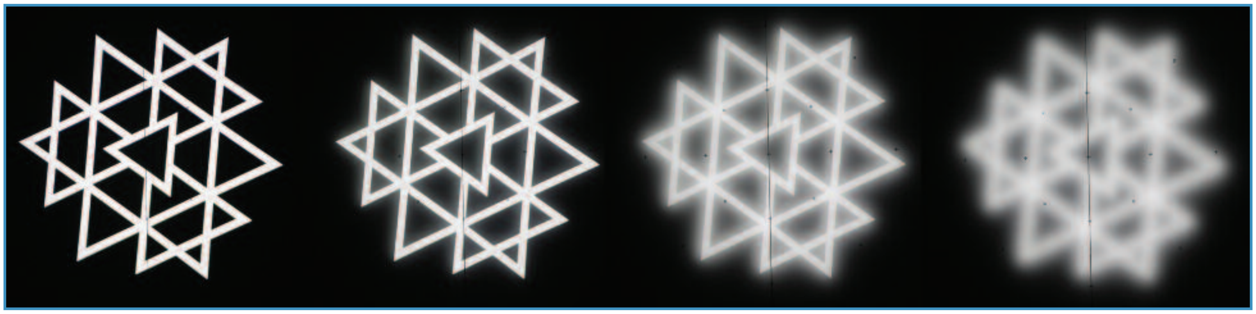

Figure 11: Frost 1.

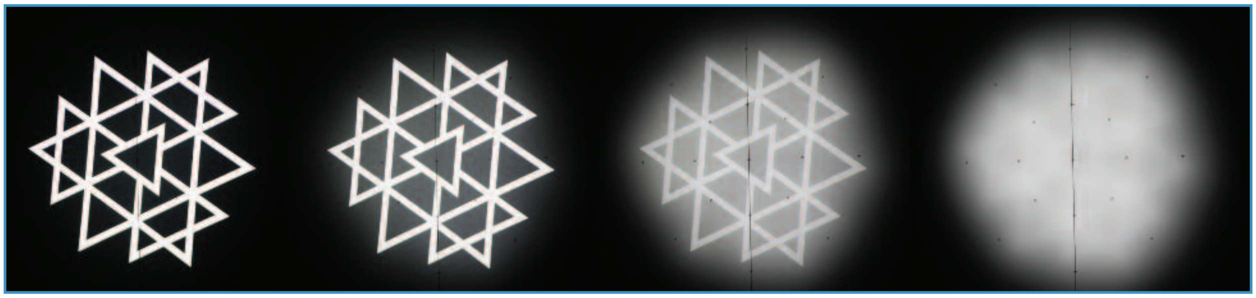

Figure 12: Frost 2.

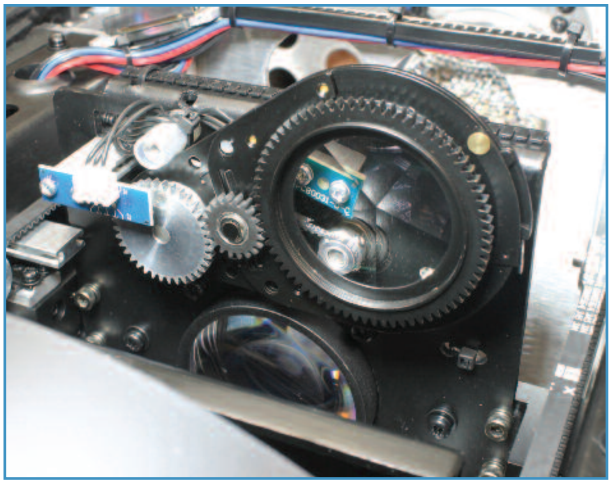
Figure 13: Prism mechanism.

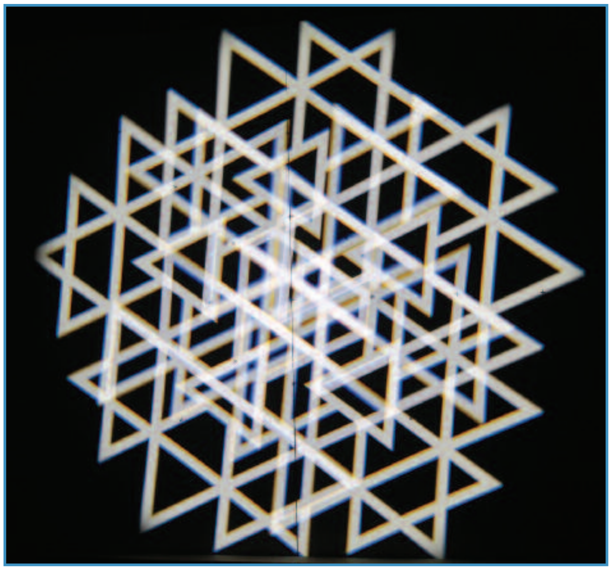
Figure 14: Prism.

which can be inserted or removed in 0.3 seconds. Once in place, it can be rotated at speeds varying from 240 sec/rev (0.25rpm) up to 0.9 sec/rev (67rpm). Figures 13 and 14 show the mechanism, and the resultant image separation.

Lenses and output

As mentioned, the Ghibli uses the typical three-lens-group zoom, with the front group fixed as the output lens and the other two groups moving to provide zoom and focus control. Zoom took 0.8 seconds to run from maximum to minimum, while focus took 0.6 seconds from end to end.

I measured the output of the Ghibli, when on open aperture without the CTB filter, at 18,000 lumens at 48.5° at the wide-angle end of zoom, ramping down to 12,700 lumens at a narrow angle of 8°. The field flatness varies with zoom angle and can be seen in the beam profiles, Figures 15 and

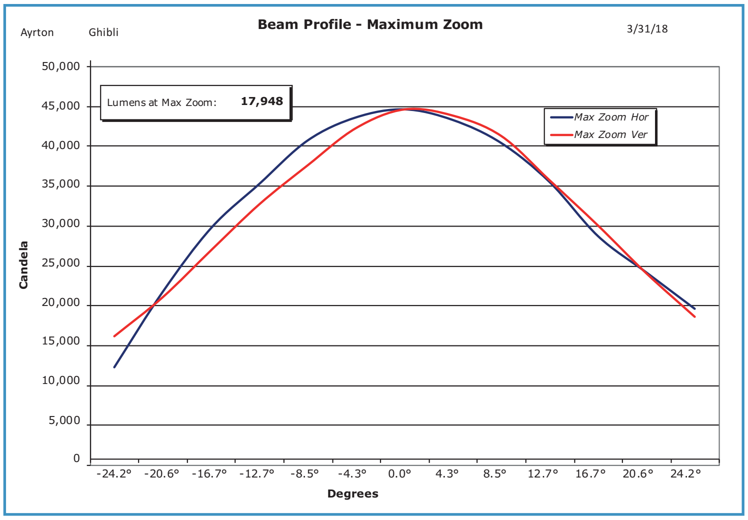

Figure 15: Maximum zoom.

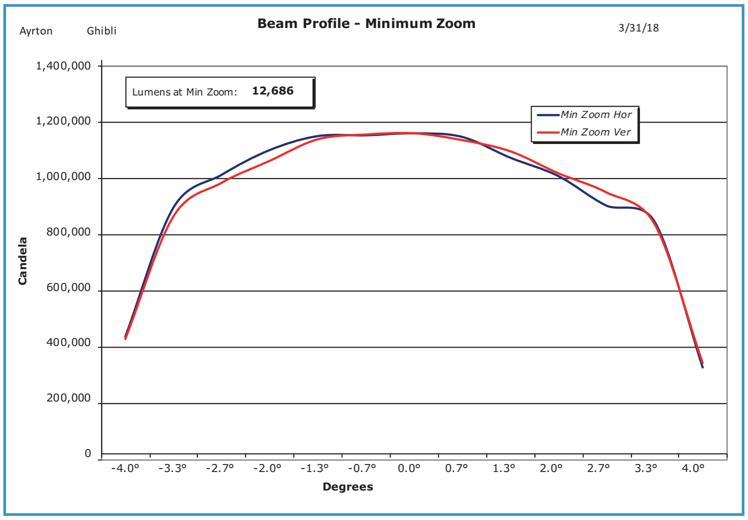

Figure 16: Minimum zoom.

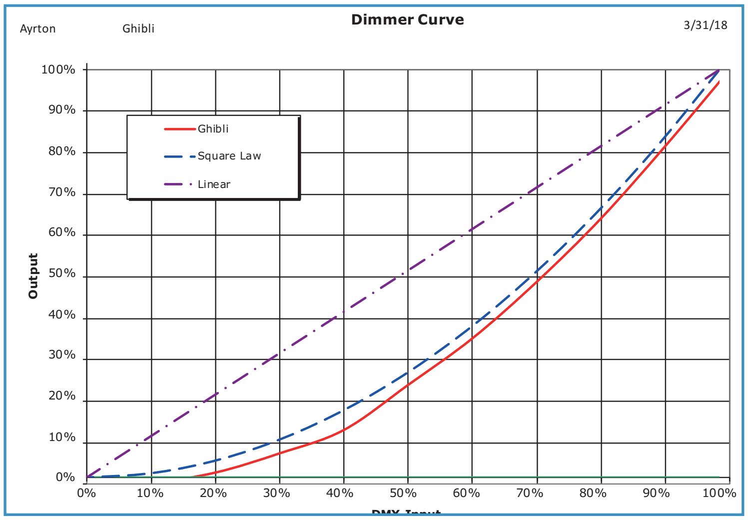

Figure 17: Dimmer curve.

16. These measurements were taken after running the unit, at full power, for at least 30 minutes to account for any warm-up droop. Droop on the Ghibli was fairly low over the first ten minutes; after turning on at full power, the output dropped by 9%.

Although the standard mode of operation provides eight-bit control (16-bit is available in extended mode), dimming was smooth and followed a default square law well, with no jerkiness and no artifacts at low dim levels (Figure 17). I measured the PWM rate at 1.2kHz. Electronic strobe of the LEDs is variable from 0.79Hz up to 27.8Hz.

Pan and tilt

The Ghibli has 540° of pan and 271° of tilt movement. I measured pan speed over the full travel at four seconds and two seconds for 180°. In tilt, the figures were 2.4 seconds for the full 271° and 1.9 seconds for 180°. Movement on both axes was very smooth, with minimal hysteresis and just a little bounce. Pan exhibited 0.19° of hysteresis, which is 0.8" at a throw of 20' (33mm at 10m). Tilt was less, at 0.08°, 0.3" at 20' (13mm at 10m). Figure 18 shows both yoke arms with the pan motor, tilt motor system, and encoder wheel clearly visible.

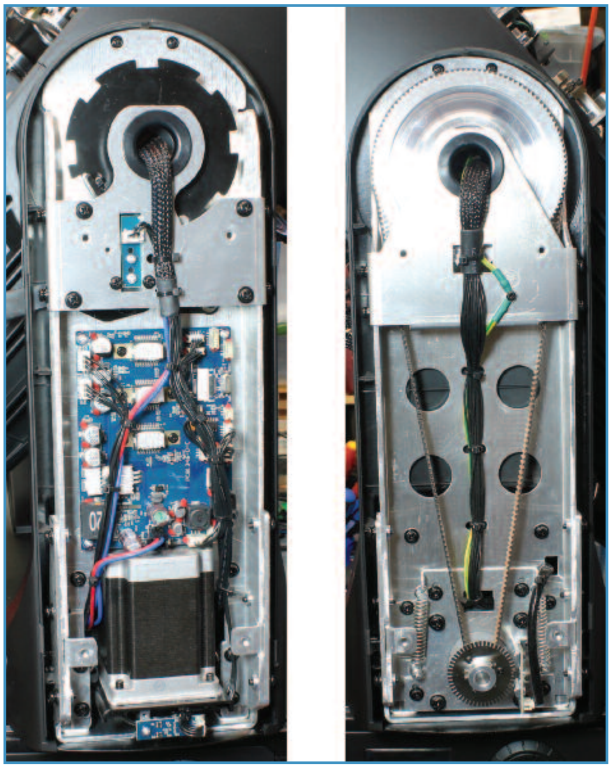

Figure 18: Yoke arms.

Noise

Not unusually, zoom and focus stood out as far as noise was concerned. Overall, the Ghibli is, I'd say, average for noise levels. Note that I measured the stationary level with a gobo inserted; the CTB filter that automatically gets added when a gobo is used reflects light back at the LEDs and raises their temperature, resulting in the fan speed increasing. The Ghibli also offers studio and silent fan modes, in which the fan speed is tightly controlled.

SOUND LEVELS

Ambient	<35 dBA at 1m
Stationary	46.2 dBA at 1m
Homing/Initialization	61.6 dBA at 1m
Pan	47.5 dBA at 1m
Tilt	55.0 dBA at 1m
Color	47.4 dBA at 1m
Zoom	53.3 dBA at 1m
Focus	56.8 dBA at 1m
Frost	46.2 dBA at 1m
Gobo	46.4 dBA at 1m
Gobo Rotate	46.8 dBA at 1m
Prism	46.6 dBA at 1m
Animation Wheel	46.2 dBA at 1m

Homing/initialization time

I measured the time for a full initialization of the Ghibli, from power up, to be 58 seconds and 40 seconds from a DMX reset command. The reset is well-behaved in that the LEDs are dimmed out before reset starts and fade up again after final positioning.

Power, electronics, control, and construction

Running as I did with a 115V 60Hz supply, the Ghibli consumed 6.9A when run at full output and allowed to warm up. This equates to 806W with a power factor of 0.99. The

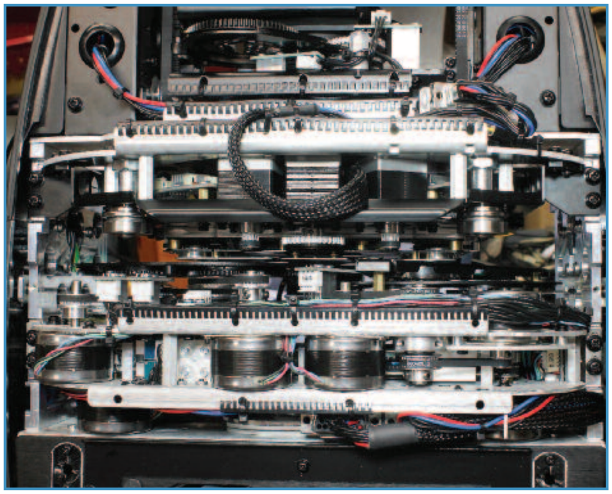

Figure 19: Head.

quiescent load with the unit powered up, but no LEDs on, was 0.8A, 96W, power factor 0.99.

Drive electronics are distributed throughout the unit with boards in the yoke arm and head. The head, as previously discussed, is modular and tightly packed. Figure 19 shows the layout, with the two optical modules at the bottom and the prism at the top. These two main modules were very easy to remove for cleaning or maintenance. Power supplies for both electronics and lamp are in the top box.

Figures 20 and 21 show the color LCD display and menu system and the set of connectors. The menu is slightly different from the norm, as it uses a single encoder wheel, which you double-click to select functions and long click to exit. I admit I found this slightly tricky to use; I couldn't get the display invert to work consistently, for example, but

Figure 20: Display.

Figure 21: Connectors.

practice would help. I don't worry too much about displays and menus; they are used very rarely when the fixture is in a show and are often covered with gaffer tape! The menu looks comprehensive and provides access to the usual fixture setup and maintenance functions. The Ghibli uses a True1 connector for power in and provides five-pin XLR connectors for DMX512 data along with RJ45 in and out for sACN and Art-Net (untested). (See Figures 17 and 18.) There is also a built-in wireless DMX system from LumenRadio, which I was also unable to test. I tested and confirmed the Ghibli's RDM functionality using a City Theatrical DMXcat. I was able to change system parameters and access temperature data. Still couldn't invert the display, though!

The Ghibli offers a number of control macro channels, including an unusual one that allows you to control and chase the vertical segments of the white LED array. This provides some interesting effects. This feature also caused me a problem that was 100% my fault! My control desk has a large optical touch screen, and one of our cats was in the workshop, "helping" me do the testing. The problem with touch screens with optical sensing is that cats can rub against them and push buttons while you aren't looking. Somehow, she managed to "park" the LED macro channel, such that only one column of LEDs was illuminated, and I hadn't noticed. Because the channel was parked, nothing I did on the desk helped. In fact, I never even considered the desk as a possibility: In my mind, LEDs out means an unplugged cable. Particularly as this was just after I reassembled the unit after taking out the optical modules. I thought I'd damaged the unit or pulled a cable out. After half an hour of trying to get it running again, I gave up and emailed Ayrton to ask for help. They asked me straight away, "You didn't leave a macro channel enabled, did you?" One very red-faced reviewer immediately realized that's exactly what he'd done. Stupid reviewer meets smart support. Thank you to Ayrton for not laughing too loudly

Conclusion

That just about wraps things up for the Ghibli. For Ayrton, it's a new sector of the market but, as already mentioned, a sector with a lot of competition. Does the Ghibli have what it takes to stand out from the crowd? I'll end, as I always do, by deliberately avoiding that question. I've given you some facts and figures, but it's your decision as to whether it will work for you.

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