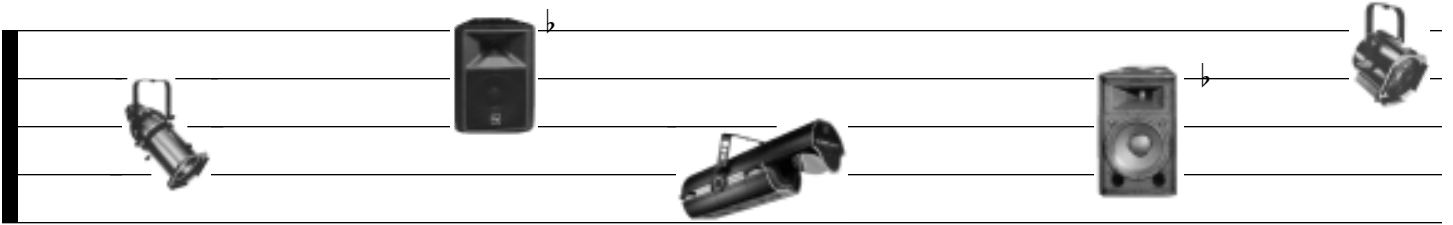


Jack A. Frost Ltd.

STAGE NOTES



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Volume 2, Issue 1

Supply and Rental of Power, Lighting, Sound and Staging Equipment

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The Altman Shakespeare

Ellipsoidal Reflector Spotlight

In 1933 Joseph Levy and Edward Kook of Century Lighting developed the Ellipsoidal Reflector Spotlight marketing it as the "Lekolite". Levy and Kook are immortalized to this day in theatres around the world, as an ellipsoidal made by any company is still referred to generically as a "leko".

The Ellipsoidal Reflector Spotlight - variously referred to as "ellipsoidal", "leko", "profile spot", "framing spot" or even ERS - has been the workhorse of theatrical lighting since its introduction over sixty years ago. Producing a good ellipsoidal is not an easy matter. A number of elements have to be brought together with some precision, yet the scale of the fixture means that using the high quality optics typical of cameras or binoculars is not economically feasible. To really complicate the issue, everything has to work within inches of a very hot lamp which can draw anywhere from 500 to 2,000 watts.

The Optics

[Physics Mode On - may be ignored by the squeamish] An ellipsoid is a three-dimensional version of the ellipse. One of the unusual features of an ellipse is that it

does not have one central point of origin (like a circle), but two "loci".

The law of reflection and the geometry of the ellipsoid combine in an interesting and useful manner: if you introduce a source of light at one locus, the rays from that source will bounce off all of the surfaces of the reflector, but all the reflected rays will pass through the second locus. This means that if you bore a hole at one end of an ellipsoidal reflector, centre a lamp at one locus, and chop the other end of the reflector near the other locus, you have a very efficient method of collecting and concentrating the light, and sending it off in one direction.

After the light rays cross at the second point (called the focal gate), the resulting beam of light can be shaped by shutters, an iris, or a silhouette pattern can be introduced by a gobo. A high-temperature glass slide can even be placed here, since the crossing of the light beams at one point has, in fact, created a projector. Further on, add one or two lenses in a sliding barrel, which will allow you to vary between a "hard" beam which is sharply in focus, or a "soft" beam which is out of focus. The soft beam has a blurred edge which allows for blending of adjacent beams. The lamp, reflector, focal gate and lens assembly have to be lined up along a single "optical axis". Add a frame on the front of the lens barrel to hold colour filters, and you have a very flexible beam-

shaping spotlight. [Physics Mode Off - but please check out Figure 1]

Development

Manufacturers have gradually introduced a series of improvements which have substantially increased efficiency of the ellipsoidal, and greatly improved the quality of its light output. Better lamps, reflectors, and lenses have all played a part, along with improved materials and techniques to deal with the heat involved.

In the 1960s and 1970s, the halogen lamp was introduced to stage lighting. As well as providing a brighter, more efficient light, the smaller filament made for better optical characteristics. The stronger, more compact construction of the lamp meant that it no longer had to be inserted into the reflector vertically.

This eventually led to the introduction of the axial-mount ellipsoidals in the 1970s. Instead of a large hole in the top of the reflector, there was now a much smaller hole behind the light source. This was more efficient, and allowed for a more even distribution of light within the beam.

Various accessories were also developed in this period: irises, stainless steel

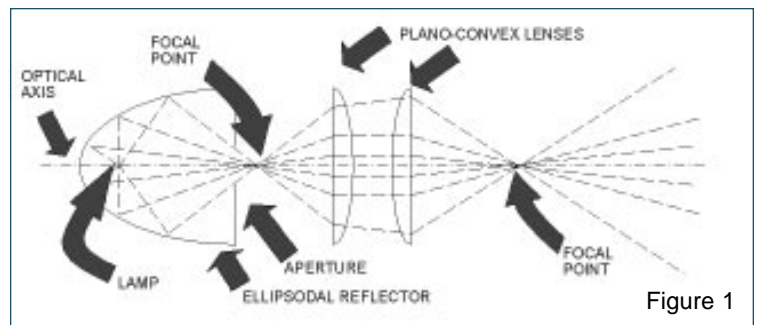


Figure 1

gobos, gobo rotators, effect wheels and colour scrollers have increased the capabilities of the ellipsoidal. Colour filters evolved from an original base of animal gelatin (hence the common term, "gel"), through acetate to the current durable polyester and polycarbonate. Hundreds of colours are available from the subtle to the intense, along with a wide range of colour-compensation and diffusion filters.

A New Generation

Now, radical changes at the very heart of this fixture - the lamp and the ellipsoidal reflector itself - have created the most significant improvement in this type of spotlight since its invention over sixty years ago. The new Shakespeare ellipsoidals from Altman embody this significant leap forward in stage lighting technology.

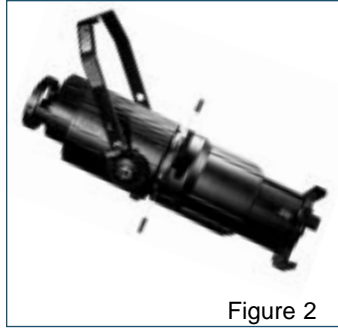


Figure 2

The new generation of ellipsoidals use a dichroic glass reflector, instead of the traditional metal mirror. This dichroic glass is transparent to the considerable amount of infra-red light emitted by the lamp. It is transmitted through the reflector and out the back of the fixture, rather than reflected into the light beam coming out the front.

Taking the infra-red emissions out of the light beam has little impact on the visible light output, since we cannot see infra-red. We can certainly feel it however, as heat. This means that the fixture runs much cooler, as do the colour filters, shutters, and gobos that intercept the beam.

Along with the new reflector type comes a new type of compact-filament, high-intensity lamp which draws just 575 watts of power. The new lamp, combined with the new reflector and improved lenses, results in a light output which is almost twice as efficient as older fixtures. In fact, the new Altman Shakespeare, with its 575-watt HX600 lamp, matches the light output of older 1,000-watt fixtures.

Along with improvements in efficiency have come improvements in the quality of the light output. The "white" light coming from most stage lighting fixtures is not evenly balanced between the red and blue ends of the visible spectrum; thus the light tends to have a yellow tinge. The reflector in the Shakespeare removes a certain amount of visible red light along

with the infra-red, resulting in improved colour rendition: "white" light actually looks much whiter from a Shakespeare, and colour filters produce more vivid colours.

Incidentally, the HX600 lamp can be used in many older axial-mount ellipsoidals, and will offer a significant improvement over the 750-watt lamps used in the older fixtures.

Better Optics

Compared with its predecessors, the Shakespeare can also produce a much more even distribution of light within the beam. The beam can be adjusted from "hot centre" to a "flat field" by turning the focus knob at the rear of the fixture. The hot centre can also be moved around within the beam. Both of these adjustments can be

done safely by hand while the instrument is running, without the use of tools.

The improved optics of this fixture produce sharper, more defined images when an isolated spot is required on the stage, or when the beam has to be shaped with shutters or gobos. [Please see *StageNotes Volume 1, Issue 1 for more information on gobos*] The Shakespeare's ability to project a sharp, clearly defined image from a gobo and sharp shutter cuts is where it most clearly shows its superiority over older units. Because the light beam is so much cooler, shutters and gobos last several times longer in the Shakespeare: gobos never become red-hot, and they are not warped by the heat, so the image stays more sharply in focus.

Safety

Significant attention has been paid to safety in the engineering of the Shakespeare - a prime consideration for those working in school environments. The reduced infra-red component of the light beam creates a fixture which runs much cooler, with a greatly reduced risk of burns for those who have to handle it. In addition, a person focussing the light does not have to touch any metal parts. A substantial rear focussing ring is made of tough polycarbonate, as is the colour frame holder in front, and the over-sized shutter handles. All focussing and adjustment knobs are safe to touch even when the lamp has been running at full for a long time. The colour frame features a spring-loaded clip to hold colour frames and scrollers securely at all angles, including upside-down. Another spring-loaded clip in the barrel assembly prevents the lens barrel from falling out - even if the lens focussing knob has been left out and the fixture is pointing straight down.

Ergonomics

Equal attention has been paid to ergonomics and convenience. If you use ellipsoidals now, you know how difficult it can be to get some critical shutter cuts that have to be made at very awkward angles, or to line that gobo up so that its angle on the stage is perfect. The Shakespeare has the solution to this perennial problem: just loosen one knob, and the entire shutter and gobo mount rotates through ninety degrees, and locks wherever you choose! The mounting is indexed so you can easily restore a previous setting. The tilt mechanism has a similarly engraved index.

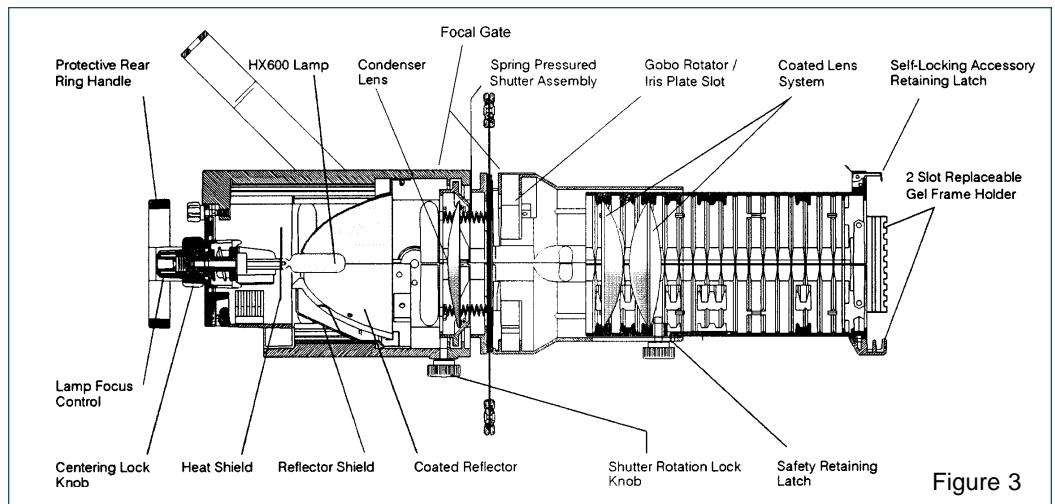


Figure 3

Fall Fixture Festival

Don't miss the great savings on these popular fixtures.



Altman 360Q
(6x9 or 6x12)
\$ 239.95



Altman Shakespeare
(20, 30, 40 or 50 degree)
\$349.95



Strand 2209 or 2230
\$269.95

All fixtures are complete with lamp, C-clamp, safety cable, colour frame and 20 amp twistlock or 15 amp U-ground plug.

Pricing is plus shipping and applicable taxes. Sale ends Nov 29, 1996.

Staff Notes



A new feature to introduce you to the usual suspects (our staff)

Al Bourke

"Mr. Al" is best described as a Jack (Frost) of all trades. If you need a sound system, service or repairs for some of your existing equipment, or a full lighting system put into your space, chances are you'll speak to Al at some point.

Al grew up in Burlington, where he attended Burlington Central High School, and then attended Humber College in the technical theatre program. He is heavily involved in volunteer work; notably Musicfest Canada, and the Sears Collegiate Drama Festival, where he has been stage manager of the Halton District since 1993. He has also served as Stage Manager for the Northwestern Regional. Al is a strong and continued supporter of Ontario arts in education.

Al joined us here at Frost in 1994, and since that time has been instrumental in upgrading our Service department so that we can service almost any product brought to us within a few days. He is well versed in sound and lighting systems, and is the organizational force behind getting those big jobs out the door on time and in good working order.

He also makes a seriously hot batch of chilli.

Flexibility

The standard Shakespeare has interchangeable lens tubes, giving beam spreads of 20, 30, 40, or 50 degrees. Large, lightweight 5-degree and 10-degree lens tubes are available for situations where the instruments are placed a long way from the stage, or a very narrow, intense beam is required. All of these lens tubes can quickly be changed by simply undoing the lens focussing knob and depressing the lens tube safety catch - the same instrument body can take any one of the six lens barrel types.

Two zoom models are also available. The "narrow" zoom has a beam angle range between 15 and 35 degrees, and is useful for long to medium throws. The "wide" zoom features a range between 30 and 55 degrees, for medium to short throws, and is useful for studio theatres with relatively low ceilings.

Efficiency

One of the most difficult problems faced by school facilities is the fact that many of the lighting systems are seriously underpowered: there are just too few dimmers available. Even when dimmers can be added, the power service available often has no more capacity. Bringing more power to the theatre can sometimes exceed the cost of purchasing new or additional dimmers, especially in older buildings.

The Shakespeare addresses a shortage of dimmers and power very effectively. With its efficient use of 575 watts, it matches the output of older 1,000-watt fixtures. Even a small system with just six 2,400 watt dimmers can handle 24 Shakespeares. This doubles the light available on the stage, and allows for much more flexibility, creativity, and use of more intense colour.

Even one or two Shakespeares can be a worthwhile supplement to half a dozen fixtures used in a classroom or small studio, offering the possibility of sharp gobo projections, and spotlights that can "punch" a powerful beam through the rest of the lighting. Its superb colour rendition also makes it ideal for use in television or video studios.

When equipping or updating the lighting complement of a theatre or studio, the Shakespeare is the ideal basic fixture. It offers efficient use of dimmer capacity, superb safety features, sensible ergonomics, convenience and flexibility which are unsurpassed in an affordable stage lighting fixture.

Paul Court (Paul_Court@jfrost.com)

The Red-Green School of Fixture Service

So, you've just got back from a glorious two months in the sun. Back to the classroom, back to the theatre and back into production once again and you find yourself wondering, "Why doesn't anything work around here any more?" Well, it's true sometimes that perhaps the equipment in your theatre or studio space doesn't really get the attention it deserves. As the saying goes, "An ounce of prevention is worth a pound of cure" - in your case, a few days of maintenance for your technical equipment will more than likely save you hundreds of dollars in eventual repair or replacement.

What we will define in this article is a preliminary maintenance plan that you can easily follow in your own theatre, along with some minor repairs.

The Maintenance Plan

- Invite as many technicians and skilled actors as you can supervise. If possible, see if any of the parents in the community would like to come out and help as well - the more the merrier. Plan to make it a fun weekend event, as well.
 - Start by making a full inventory list of anything "technical" in the theatre that you can see. Take all the lights off their pipes - with the exception of permanently installed fixtures - making notes on where they were hung and focussed so you can put them back up when you're done. Clean the stage deck off, and line all the equipment up on the deck, so you can see and get to everything.
 - Quickly check all of your equipment as either "working" or "broken." Make sure that all of your lighting fixtures actually light up, shutters work, focus knob turns, and so on. (You may need an extension cord on stage so you can plug them in.) Make sure that all of your extension cables still work.
- If you don't know what something is, or don't know if it's ever worked, make a note of that too. You can research it later.
 - Evaluate the items on your "broken" list. If you can fix minor items safely, then do it, if not, set them aside. Don't try to fix anything you don't understand completely! Then, clean the items on your "working" list, because everything gets a little bit dirty and it can't hurt to clean it off. In fact, by cleaning a lighting fixture thoroughly I've known light output to increase by at least 30%. (See the following checklist.)
 - Anything that was repaired note on your inventory list. Include the date, and what you did to repair the item. Also try to note the suspected cause of the problem. This will help you to prevent those things from happening in the future.
 - Make arrangements to have the items that weren't repaired sent to an authorized theatrical service centre.
 - Tag all of the working items with a piece of coloured tape, or a big happy face sticker, to say "OK" and the date.
 - Check your inventory of lamps and spare parts to see if you have to order new ones. If you have spare lamps the ones in the lights "tend" (according to Murphy) to blow less.
 - Put everything back where you found it, re-focus your lights, and "voila" - you have performed some much needed, yet still quite simple, preventative maintenance on your theatrical space. Sit back and enjoy! (Well, OK, until the next rehearsal anyway.)

A few words about safety

- Please remember, that whenever you are working with live electricity in any form, there is a great risk of injury. Use extreme caution when plugging



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in and testing any lighting fixtures, cables, or any other electrical equipment that you have.

- All electrical equipment which is broken should be tested and repaired by a qualified electrician.
- Follow all of the safety rules within your theatre space when hanging and removing lighting fixtures. Make sure that ladders, scaffolds, and man lifts are used in their prescribed manner only.
- Make sure that you have access to a telephone (in case of emergencies) during your weekend maintenance session.

Maintaining Lighting Fixtures

You will need: Set screwdrivers (Robertson green, red, Philips, Flat), channel lock pliers, soft lint free cloth, soapy water, and a 3" clean dry paintbrush.

Ellipsoidal Reflector Spotlights (Lekos)

- Make sure that before you start, the fixture is unplugged from any electrical circuits. Also, put the fixture on a large table so that you don't risk dropping any fragile parts like lenses.
- Use the brush to dust off the fixture.
- Remove the lens barrel by removing the retaining screw which you use to focus the fixture. This will give you access to the two lenses that this fixture uses.
- The lenses are held in by spring retainer rings which can be carefully sprung from their mountings by using the channel lock pliers. If you can't get them out, don't force them as there is a good chance you could accidentally shatter the lens! Don't worry though, as most of the dust and dirt accumulates on the exterior surfaces of the glass.
- Clean the lens with the cloth and soapy water. Try not to get water inside the fixture.
- Remove the burn base of the fixture as if you were changing the lamp.
- Don't forget, NEVER touch the glass of a lamp with your fingers. This drastically shortens the life of the lamp. If you're not sure, or if you have touched it, clean the glass of the lamp off with some lens paper and denaturalized alcohol.
- Visually check the burn base. Make sure that it isn't cracked, or blackened, or otherwise physically damaged. If it is, you will have to have it repaired or replaced.
- Open the case and check to see that the shutters move in and out easily. If not you can take them out and flatten them with a hammer, or bend them back into shape. (If your shutters are rivetted in place, they cannot be removed without replacing the shutter. Have these fixtures repaired by a qualified technician.) Take care not to bend them too much though - you could fatigue the metal, and then it would snap in your hands. Shutters with nasty burn holes should be replaced. Shutters which tend to "stick" and not slide together smoothly can be lubricated with a small amount of graphite dust.
- Visually check the plug for cracks, chips, or burn marks. If you see any of these make sure that the plug is replaced and tested by a qualified electrical technician. Also check the cord. Frayed cords are as hazardous as burnt out plugs, and may indicate that the fixture is damaged in some other way as well.
- Make sure that there's a safety cable for the fixture. If you want to hang it on a pipe, you have to have a safety cable on it.

- Put the lighting fixture back together. Make sure that you don't have any parts left over!
- Using considerable caution, plug the fixture back into your power circuit. If it works, unplug it and tag as discussed earlier. If it doesn't, try changing the lamp with a new one before sending it away for repair.

Fresnels

- Again, make sure that before you start, the fixture is unplugged from any electrical circuits.
- Use the brush to dust off the fixture.
- Open the lens door by raising the spring clip which is usually located directly adjacent to the lens. This will allow you to clean the lens from both sides easily, using the same technique as with the Lekos.
- Visually check the burn base and make sure that it isn't cracked, blackened, or otherwise physically damaged. If it is, as with all your fixtures, you will have to have it repaired or replaced.
- Make sure that the focussing knob (located on the rear or the bottom of the fixture) is able to slide the burn base from the front to the back. If not, check to see if there is a minor mechanical repair required, such as replacing the screw with an identical, new one.
- Visually check the plug and cord for damage of any kind. Have your electrical technician replace these if they are not satisfactory.
- Check for the safety cable.
- Put the lighting fixture back together and make sure that you don't have any parts left!
- Using considerable caution, plug the fixture back into your power circuit. If it works, unplug it and tag as discussed earlier. If it doesn't, try changing the lamp with a new one before sending it away for repair.

Feel free to call or E-Mail me at any time if you have a question. The folks at Frost are more than willing to lend an ear and help you out with some friendly advice. And if you run into real trouble we can come right to your theatre and work out your problem - often within the next 48 hours. We have a large inventory of equipment available for replacement while yours is being repaired.

Al Bourke (service@jfrost.com)