

CONSOLE OPTICAL ALIGNMENT

Alignment of projector to Console & Lamphouse

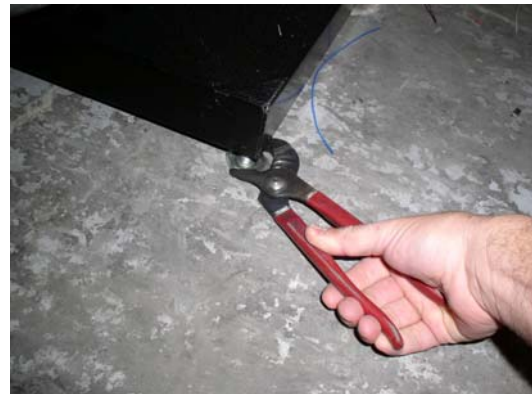
♦To gain optimum performance and bright, even light on screen, proper optical and mechanical alignment of the projector to the lamp optics is crucial. A proper alignment will result in even light distribution and a bright, clear image on screen. Any mis-alignment will result in uneven light distribution and poor image reproduction.

Projector Mounting

- ♦Most consoles are shipped from the manufacturer with either the projector mounted, or the mounts provided for the projector to be mounted in the field.
- ♦Most manufacturers ship the consoles with the optical system pre-set, but it is always wise to do this procedure again at the theater to insure optimum screen picture quality.
- ♦If the projector is being mounted at the theater, this procedure is done once the installation of the projector on the console is completed and operating properly.
- ♦Alignment kits are available, using strings, lasers, discs, or other methods of aligning the projector to the optics. While this will give you a good starting point, it is always best to finish the alignment by viewing actual projected light.

Mechanical Alignment - Preliminary

- ♦Generally, before any work is done, make a visual inspection of the entire system, making sure all the console components are in place, un-damaged, and have not shifted or moved from their correct location.
- ♦The first step is to make sure the console or lamphouse is level. Raise or lower the adjustable feet in the base until the system is level, resulting in a level starting point to reference the rest of the system to. (Remember that any unevenness of the curtains or masking will be compensated for later with the filing of the aperture plate.) Once the system is leveled, DO NOT ALTER! This is the reference for the rest of the system!



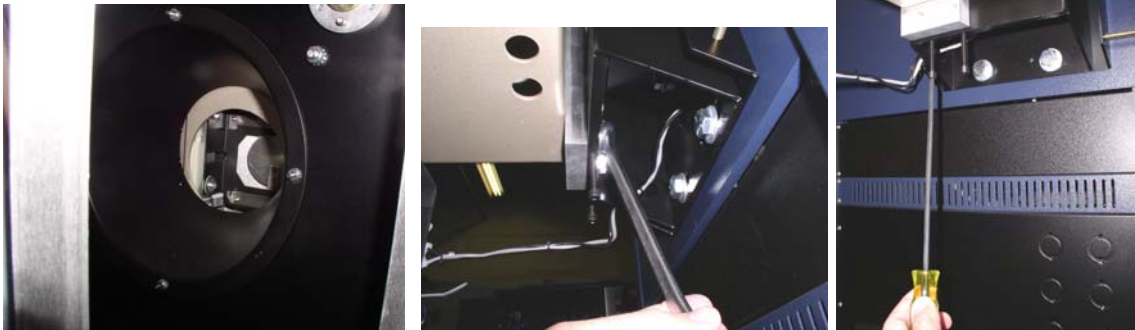
Working Distance of Optics

♦Check the position of the optics assembly to the projector, to be certain the working distance of the reflector is correct in reference to the film gate. Either measure both inside the lamphouse and then on the projector, or one measurement through the film gate.



Mechanical Alignment

♦Next the projector is roughly positioned. First look into the projector from the lamphouse to see where the projector is positioned in reference to the nose-cone. This will give you a good idea of where the projector needs to be moved for an initial rough alignment.



♦To move the projector on a BIG SKY Console, slightly loosen the four 3/4" retaining bolts on the projector side of the main mount, and using the two vertical positioning screws to raise or lower the projector until the aperture is roughly centered to the nose cone. The projector must also remain level to the console during this process. Tighten the four retaining bolts once a final position is set.

♦If a horizontal position adjustment is needed, slightly loosen the four 3/4" bolts securing the mount assembly to the console, and move the projector horizontally via the adjusting screws until the projector is also roughly horizontally centered in the nose cone, again keeping the projector level to the console. Tighten the retaining bolts.

Final Basic Unit Pre-Adjustments

◆ Finally, center all bulb positioning controls and install the bulb. Raise or lower the positive post so that the bulb is level with respect to the lamphouse floor.



◆ Position the positive post laterally so that the positive pin of the bulb will not fall off the “V” for the full focus movement. The console and projector are now ready to be optically aligned.

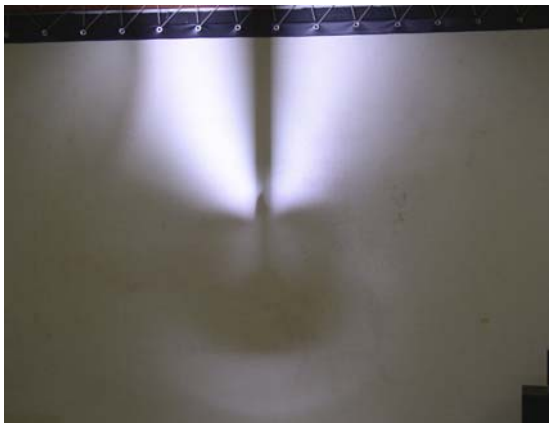
Aiming the Console

◆ Finally, it is time to get ready to strike the bulb and tilt the console so that the optical centerline is centered on the screen.

◆ First, on the BIG SKY Console, loosen the tilt clamping bolts on both sides of the console in the lower compartment.

◆ Strike the bulb, and immediately verify the bulb is running at a correct voltage and amperage within the bulb manufacturer’s specifications.

◆ You should get some sort of image which consists of a dark centered spot, white light, and the “flame”.



◆ Tilt the console so the spot is centered on the screen, and tighten the tilt clamps on the console. (You may have to do this again at the end of the procedure to make sure the optics are centered on the screen)

Initial Lamp Adjustments

◆By adjusting the horizontal, vertical, and focus lamp adjustments, the flame is to be centered behind the black dot (positive end of lamp)



Getting the Rings...

◆Now adjust the bulb focus so that circular rings appear around the black dot. These rings will be used in the process from this point forwards.

Positioning the Projector

◆Now it is time to re-position the projector so that it is centered on the optical centerline.

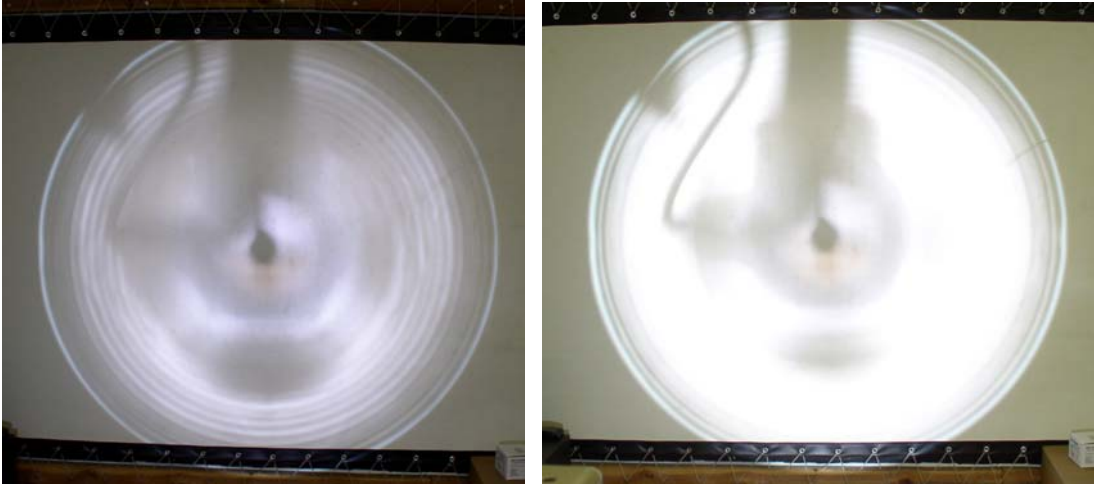
◆Again, the projector will need to be raised or lowered, and/or horizontally moved so that the projected light image is now a full circle, with no portions cut off. It may take a few adjustments to finally get the projector into final position. After each move, re-center the flame under the dot with the bulb adjustments on the basic unit.



◆ALWAYS keep the projector level to the console and floor. This will keep the image level and straight on the screen. Masking adjustments and aperture plate filing will fine-tune final picture size.

Final Projector Positioning

- ◆Currently, the projector is close to being aligned, but final adjustments will be needed for best picture quality.
- ◆Adjust the bulb focus so that the flame size fills half the circle, and dark circles appear around the outside edges of the light pattern.
- ◆If the projector still needs to be moved, the darkness on the screen will indicate the direction the projector is to be moved in. Again, after each move, re-center the flame with the lamp adjustments.
- ◆A proper final position will have the dark outer rings even and centered.



Final Check

- ◆To make sure the position is good, adjust the bulb focus so that the flame now fills almost the entire image, just leaving a “halo” of light. A perfect “halo” indicates a properly aligned projector on the optical axis.
- ◆Once this point is reached, tighten ALL projector mounting bolts tightly, so the projector cannot move again.
- ◆These adjustments will never be needed to be moved again.

Checking the Light with the Lens In...

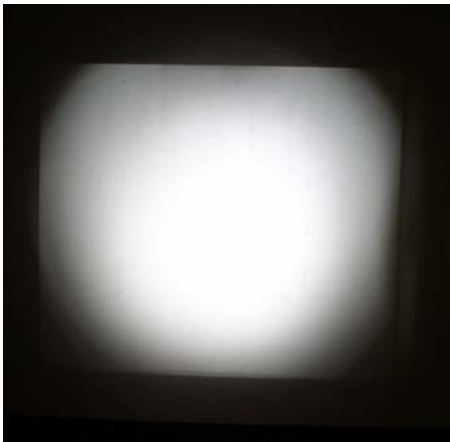
- ◆Now the quality of the projected white light with the lens in can be checked.
- ◆Without changing bulb focus, close the douser, and insert the lens. When the douser is opened, a centered ball of white light should be seen. Only view this for a few seconds before closing the douser to avoid lens damage from overheating.
- ◆A properly aligned system will have this ball centered on the screen. If needed, move or tilt the console as needed.

Final Image Adjustments

- ◆Now the ball of light can be spread out, or “flattened” so that the picture is an even shade of white.
- ◆First, de-focus the bulb until only the corners are dark, again checking to be sure they are evenly spaced and uniform to each other.



- ◆If the reflector is mis-shaped, this is where it will be most evident. If the rings are even, yet the “ball” of light is not even or obround, with opposite corners only being even, this is usually an indicator of a reflector problem. If the reflector is badly mis-shaped, the problem will be evident when trying to center the rings of light previously in the process.
- ◆Finally, finish adjusting the bulb focus until the corners are white, and the light is uniformly spread.



- ◆If checking the brightness with a light meter, the center should read anywhere from 12-16 lumens, with the sides generally three to four lumens less, equal on both sides.
- ◆Always be careful not to leave the douser open too long when viewing white light through the lens, as lens elements may crack from heat.

Theater Details...

- ◆The projector part of the alignment is now complete.
- ◆If the screen and masking are present, final aiming and aperture plate filing are now done to finish the installation.
- ◆General procedure from here is to now run RP-40 to exactly center the image on the screen, and then enlarge the aperture plate to fully fill the screen with projected light. With the RP-40, masking position can also be set in final position.
- ◆Lens specifications have already been determined, based on screen size and throw distance. At this point will you be able to verify the calculations are correct.
- ◆All sound system alignment, equalizing, and set-up is also done at this point.
- ◆Lights, camera, action, time to roll the show!