LP Morgan

Galleria Noir

Image Performance Guide

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LP Morgan Noir Image Performance Guide

The LP Morgan Noir is a projection screen designed for use in ambient light situations. The screen surface comprises of multiple levels of filters that accept projected light and reject some ambient light. This design feature means that there are certain installation and specification criteria that need to be carefully considered.

This document is divided into three parts:

- Background and explanation of the Noir and how to optimize its performance
- Checklist for use in assessing site suitability
- Sales and Demo Advice

Key Benefit of Noir - Optimising Image Contrast

A vastly improved image contrast is the core advantage of the LP Morgan Noir Screen. This is the quality parameter that must convince your customer of the superior screen performance.

Compared to a standard white front screen in a room fitted with ceiling lighting, the LP Morgan Noir Screen can reach an image contrast up to 10 times higher and increase image brightness by a factor of 2.

How does the Noir work?
The Galleria Noir achieves this by using an optical structure. The optical structure has been engineered to reject ambient light from certain angles – particularly overhead lighting.

Light coming from above or below the screen is filtered away by the contrast lens. This makes the screen very resistant to incident light coming from the floor or ceiling, but it is less resistant to light coming from the sides or from the front.

This means:

- That in a room without windows which is fitted with ceiling lighting (eg flouros or down lights) the LP Morgan Noir Screen delivers up to 10 times higher contrast than a white screen.

- Where light comes both from electrical lighting above, and from either windows or electrical lighting on the sides, there will be some impact on screen performance. In particular strong light coming from the sides, particularly where it directly hits the screen will have a negative impact on the screen performance. But the LP Morgan Noir Screen will always perform better than a normal white screen.

To minimize the affect of side light on the image, try and position the screen a distance from the windows and definitely avoid sunlight from the sides falling on to the screen surface.

In balancing the requirement of making the screen resistant to ambient light and have the widest possible viewing angles, the optics are pitched to reject overhead light only. As a result, careful consideration must be given to placement if there is direct light falling on the Galleria Noir from the sides or from a light source in the same direction and location as the projector. Also be very aware of the lighting conditions changing during the day and the effect this may have on the projected image quality.

Choosing a Projector

As with every projection installation, ***the projector specifications play a big part in the quality of the image***. This is as important when using a Galleria Noir as with any screen HOWEVER there are some quite specific considerations to be aware of when specifying the installation site.

To determine the appropriate projector you will need to consider:

- Screen size, format,
- installation environment
- and image quality requirements

We have developed a spreadsheet that can help you with the precise calculation. If you require an additional copy of this excel tool please request the Noir Projector Brightness Tool to be sent to you.

While we strongly recommend using the spreadsheet for a precise result, we are happy to provide you with basic guidelines.

We have provided you with two different scenarios with different ambient light conditions. One with 250 lux ambient light on the screen surface, corresponding to approximately 500 lux in the room; and one with 300 lux on the screen, corresponding to 600 lux in the room. In both scenarios the contrast ratio of the final image required is 20:1, which represents a good level for Home Theatre viewing.

Required Projector Brightness

The general rule with projection is - the bigger the screen and/or the lighter the room, the brighter the projector needs to be. The very same rule applies when using a Galleria Noir. We have developed a calculator that will assist in determining what lumen output a projector needs to have, given the light level of the room, to take full advantage of the Galleria Noir.

Scenario 1:
250 lux ambient light on screen, 500 lux in the room.

Screen Size Diagonal inch	Screen Format: Aspect Ratio	Projector brightness Real life ANSI lumen*
45”	4:3	700
60”	4:3	1200
72”	4:3	1700
84”	4:3	2300
100”	4:3	3250
45”	16:9	600
60”	16:9	1100
72”	16:9	1500
84”	16:9	2100
92“	16:9	2500
100”	16:9	3000

Scenario 2:
300 lux ambient light on screen, 600 lux in the room.

Screen Size Diagonal inch	Screen Format: Aspect Ratio	Projector brightness Real life ANSI lumen*
45”	4:3	800
60”	4:3	1400
72”	4:3	2000
84”	4:3	2800
100”	4:3	4000
45”	16:9	700
60”	16:9	1300
72”	16:9	1800
84”	16:9	2500
92“	16:9	3000
100”	16:9	3500

***Real life ANSI lumen = ANSI lumen of the projector after it has been adjusted according to grey scale and after taking lamp decay into consideration.**

Installation Considerations

The screen can handle both on-axis and off-axis projection optics (up to 105% off-axis).

Take into consideration that the main angle of the brightest image is a mirrored reflection of the incoming projected light. Because front projection essentially is a reflection, there will be a mirror reflection in the centre direction that can disturb the image.

In the following sections you can read our advice on the ideal positioning of both screen and projector mounting to optimise the Noir performance.

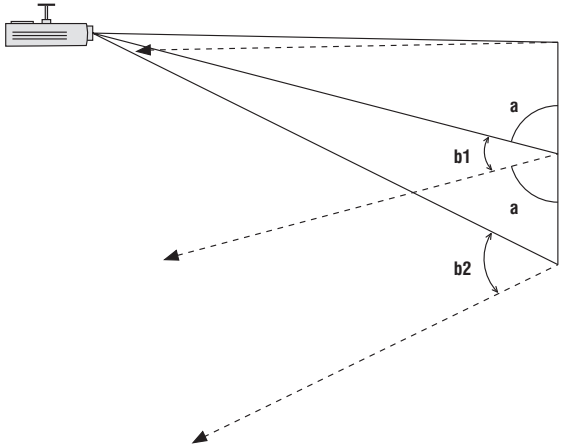
Screen Position on the Wall

If you mount the screen in a conference or meeting room, the optimum height is between 1000-1200 mm from the floor. This secures a good viewing position for most in the audience.

Projector Mounting Considerations

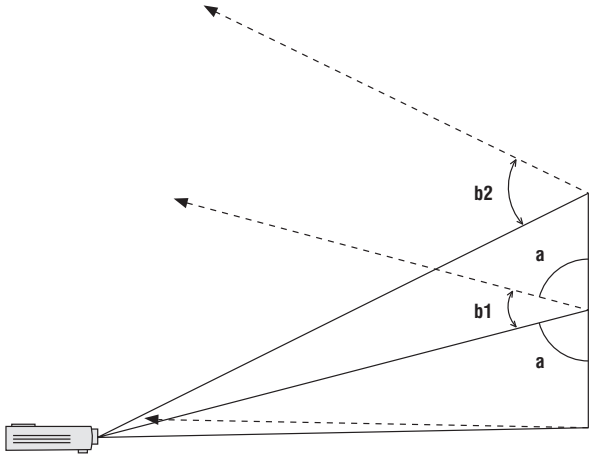
Example 1: Ceiling mounted projector – 100% off-axis:

If the projector is installed on the ceiling, aligned with the top of the screen, the light in the bottom half of the screen is reflected towards a larger angle (see b2) than at the top of the screen (see b1). Thus the top will seem brighter than the bottom. But this depends on the projection distance. The longer the projection distance the smaller the difference. This is why we recommend a projector throw distance of greater than 1.8:1.



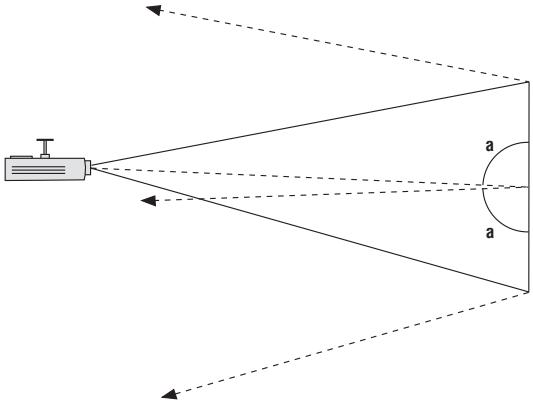
Example 2: Table mounted projector – 100% off-axis:

If the projector is positioned on a table, aligned with the bottom of the screen, the light at the lower part of the screen will be reflected at a smaller angle (see b1) than in the upper half of the screen (see b2). As the projected light hitting the upper part will be reflected to the ceiling, the bottom part of the image will seem brighter. The longer the projection distance the smaller the difference. This is why we recommend a projector throw distance of greater than 1.8:1.



Example 3: Centre mounted projector – NOT RECOMMENDED

If the projector is positioned so that the lens centre is level with the screen centre, the reflection of light is equal for the lower and upper part of the screen. There should be no difference between these two, however there is the risk of a classic hot spot in the centre as the light will be reflected right back in the direction that it comes from. This varies with the projected distance though, this projector positioning is the least preferable.



Normally mounted projectors provide the best quality image quality.

Other Installation Considerations

After having established the appropriate projector brightness for the lighting conditions of the room you are installing the Noir in and assessed the lighting sources in the room, there are 3 other variables you will need to optimize in order to get the best performance possible out of the LP Morgan Noir Screen. These are:

- The position of the projector
- The lens throw ratio
- The position of the screen compared to the viewer

The position of the projector

As with every install, the projector should be positioned to completely fill the screen. Again to utilise the optical properties of the surface to the fullest, the top of the projector lens should be mounted ±5% from the top or bottom of the frame. This will ensure that no projected light is rejected by the screen optics.

The lens throw ratio

We recommend using projectors with a lens throw ratio (LTR) of 1.8:1 or longer. This corresponds well to the standard optics of most projectors.
Why? The projector lens must be at least a 1.8:1 ratio to avoid hot spotting. If the lens has a zoom, the projector should be placed so the zoom is at the narrowest possible angle to fill the screen (as far away from the screen as you can get then zoom in). If you use a short throw lens, or a shorter projection distance, there will be a hot spot. The shorter the LTR the worse the hot spot will be. The longer the LTR the less visible it will be.

The LP Morgan Noir Screen works fine with all single lens projectors (LCD, DLP, LCOS, D-ILA). It has not yet been evaluated using CRT. This will be tested soon.

The position of the screen compared to the viewer

Just to recap, the optimum height for a screen in a meeting or conference room is between 1000-1200 mm from the floor. This secures a good viewing position for most in the audience.

Many people have asked for a gain chart for the Noir. At this stage there is no gain chart available for the Noir. Why? The gain peak direction depends on the off-axis percentage and the lens throw – as a result there is no single gain chart for the screen, there are actually many. As a result, DNP have decided not to publish any gain charts for this product at all.

Summary

The Noir can give an excellent result but consideration must be given to:

- The direction of ambient light in the room
- The brightness of the projector required
- Installation position of the projector
- Lens Throw Ratio should be longer than 1.8:1
- Screen position on the wall

The following checklist gives an easy to follow step by step guide to determining the suitability of the Noir for an install site.

Galleria Noir

Onsite Assessment Check List

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Found an application where you think a LP Morgan Noir will work perfectly?
By working though this check list you will ensure the results you achieve will match your customers expectations.

Step 1 You will require a light meter.
Measure the strength of the light falling on the area where the screen is likely to be installed
Insert this measurement below.

Lux

Step 2 Taking the above measurement, use the included "Noir Projector Brightness Tool" to determine what brightness level the projector should be. ***Remember - The level of brightness required is a factor of the ambient light conditions of the room and the screen size.***
Insert this figure below

Lumens

Step 3 Check - is there a light source directly behind the projector?

☐ **Yes** ☐ **No**

This will reduce the quality of the projected image.
The Noir may not be able to overcome the interference and will not perform to expectations. Why? The screen will not be able to differentiate between this light source and the projected light and will reflect both equally.

Step 4 If Yes, can the light be disabled or removed as it will interfere with the projected image quality

☐ **Yes** ☐ **No**

This will reduce the quality of the projected image.
The Noir may not be able to overcome the interference and will not perform to expectations. Why? The Noir is formulated to reject light from above, and is less efficient at rejecting light from the side.

Step 5 Check - is there a light source on or to the side of the screen?

☐ **Yes** ☐ **No**

Step 6 If Yes, can the light be disabled or covered as it may interfere with the projected image quality

☐ **Yes** ☐ **No**

This will reduce the quality of the projected image.
The Noir may not be able to overcome the interference and will not perform to expectations. Why? The Noir is formulated to reject light from above, and is less efficient at rejecting light from the side.

Step 7 Check - does the projector have a lens magnification of at least 1.8:1

☐ **Yes** ☐ **No**

Step 8 If No, the projected image will have distinctive "hot spots" and will not perform to expectations. A change in projector lens or model may be necessary to achieve perfect results.

Step 9 Check - Can the projector be installed within +/- 5 % of the top or bottom of the image area.

☐ **Yes** ☐ **No**

Step 10 If No, the projected image will have uneven light distribution and will not perform to expectations. A change in the position of the projector may be necessary to achieve perfect results.This may involve a change in projector lens to one that has a narrower focal range so the projector can move further away from the screen.

☐ **Yes** ☐ **No**

Ticked YES all of the way through?
The Noir will perform fantastically when matched with a suitable projector.
Have you Ticked NO?
The Noir may perform to your expectations, but it could be better.

How to Run a Split Screen Demo

When doing split screen demos the character of the image has a huge impact on the perceived difference in image contrast between the LP Morgan Noir Screen and a white screen.

In order to show the advantage of the LP Morgan Noir Screen the image should contain large dark gray/black areas and rich colors. Use our predefined slideshow in order to get the best performance. Please contact us if you do not have it yet, and request the Noir Images Demo Disk.

When comparing two displays it is difficult to use a video image, as there can be a huge difference in brightness between different sections of the image.

We recommend that you start your demonstration with a still picture such as a checkerboard pattern, a double gray-scale or even better a double color scale where the full scales are displayed on both screens. In any case please choose content that shows the performance difference. If you choose to go with a movie, the best result will be with one with very colorful images.

Please remember:
In bright environments, where there is ambient light, the screen is the component that sets the final image contrasts - NOT the projector!

Some Final Sales Advice

In split screen demos we have been very successful with demonstrations that start out in normal ambient light. Then we turn down the light, so that both screens show roughly the same image quality. And then we turn the light back up. It demonstrates the difference very clearly.

We wish you the best of luck with your demonstrations and sale.

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