



WORLD'S LARGEST PROJECTOR RESOURCE

NEC PE456USL WUXGA 3LCD Laser Projector

Our Take

The Sharp/NEC NP-PE456USL is a versatile short throw installation projector made for tricky applications found in museums, retail, entertainment, and business/education environments. Its nicely bright, no-maintenance laser light engine and array of installation features make it one to consider for those with challenging projection needs.

Pros

- Bright 4,500-lumen rating and maintenance-free laser light engine
- Short throw with excellent placement flexibility
- Five-year parts and labor warranty

Cons

- No optical zoom or lens shift
- No integrated Wi-Fi



The [Sharp/NEC NP-PE456USL](#) was made with challenging applications in mind. This short throw laser projector boasts 4,500 rated ANSI lumens, and projects a beautiful image even with ambient light shining directly in front of the screen. The entry level installation projector is geared toward a variety of markets—business, education, museums, retail, and even entertainment and golf simulators. The NEC can produce a 130-inch diagonal image from just 4 feet away. If casting a shadow on the projected image is a concern, or space is tight, the PE456USL may be one to consider.

With a typical street price of \$2,579, the PE456USL is mostly competing against long-throw projectors in this 3LCD, WUXGA product class. The [Epson PowerLite L530U](#) is a laser projector with a \$2,651 price tag, and for that extra sub-\$100 difference, it packs 5,200 lumens and up to a 500-inch diagonal image. The \$2,547 [Panasonic VMZ51U](#) is another long throw laser with 5,200 lumens. In both cases, you'd be sacrificing the short throw lens for long throw. Among price-competitive, short-throw LCD projectors targeting the same applications with similar resolution and brightness, the pickings are slim. Epson's recently announced [PowerLite L210SF](#), a 1080p model, should sell for less than the Sharp/NEC when it starts selling in the Spring, but it offers just 4,000 lumens compared with the PE456USL's more substantial 4,500 rating.

The PE456USL claims ease of installation, with several features that support that claim. The projector is 4K ready, with great image quality. Along with Sharp/NEC's other laser projectors, it has an excellent warranty.

Features

The PE456USL is a compact and lightweight projector that measures 15.9 x 6.5 x 15.9 inches (WHD) and weighs in at just 17.9 pounds. That should allow it to fit tight spaces and be easily mounted or moved around. As mentioned, it sports WUXGA (1920x1200) resolution from a trio of 0.64-inch LCD imaging panels, which gives the projector immunity to rainbow artifacts that may occur with some single-chip DLP projectors as well as equal white and color brightness to insure good color fidelity. It also supports 4K

content up to a 30 Hz frame rate using NEC's video processing/scaling chip. There's a basic control panel on the projector's top panel that lets you power it on and off, switch inputs, and access or navigate the menu.



The PE456USL's blue laser+yellow phosphor light engine has a lifespan of up to 20,000 hours at full power, with its Eco modes extending that. There are four energy modes (Normal, Full Normal, Eco 1, Eco 2) and you can also manually adjust the brightness of the laser in the menu. Though the projector is low maintenance, it does require periodic cleaning of the filter accessible from the side panel, and past 1,000 hours of use it will automatically remind the user at turn-on with an onscreen message unless that time is extended in the menu (settings are available for 500, 1,000, and 2,200 hours). Failure to clean the filter could eventually result in overheating, though I found the projector doesn't heat up too much during normal use with a clean filter.

As mentioned, images are projected through the short throw lens with fixed optical zoom and a very tight throw ratio of 0.44:1. This results in an unusually short throw range of just 1.7 to 4.16 feet, with an image size range of just 55 inches to 130 inches max. You can visit the [ProjectorCentral Sharp/NEC PE-456USL Throw Calculator](#) to see

the lens-to-screen distance for your preferred image size. Though it lacks adjustable optical zoom, the projector does have a digital zoom function that allows some zooming in of the image, though there is no vertical or horizontal lens shift. The manual focus is accomplished with a lever above the lens.

A reasonably well-equipped connection panel is found on the projector's rear. Two HDMI ports are version 1.4b with HDCP copyright management, and there is a 15-pin VGA analog input as well as a VGA output that could be used to feed a monitor in an overflow room or a podium monitor if needed.

The projector has PC-free presentation via its USB Viewer, and this worked without a hitch. It's plug-and-play, and produced very good image quality. The same USB port accepts an optional dongle for wireless connection to a network, or you can make a wired connection via the RJ-45 LAN port. An RS-232C control port is also on board.

Two 3.5 mm jacks facilitate audio input and output. The PE456USL's 16-watt built-in speakers sound excellent for on-board speakers, producing enough sound for a large room. They do lack bass, as is to be expected, but the sound is smooth and not too tinny like many commercial projectors. Should your setup include an external audio system—which is always recommended—it can be controlled using the projector's remote thanks to its Variable Audio Out port.

The remote control is lightweight, white, and easy to see in a dark room even without being backlit. It's 7 inches tall and 2 inches wide and is used with several NEC projectors. It has plenty of buttons for key functions such as switching inputs, navigating the menus, using Digital Zoom and Keystone Correction, changing the Picture Mode or Aspect Ratio, kicking the projector into its Eco modes, and adjusting volume.



This NEC comes with a variety of useful networking features. It has the usual wired LAN (RJ-45 port with 10/100 base-T capability) and wireless LAN via Sharp/NEC's NP05LM1 Wi-Fi adapter (an \$85 option) plugged into the USB-A port, though it lacks integrated Wi-Fi as found on some competitors, notably Epson's models. Once connected to the network, it has Crestron RoomView compatibility for managing multiple projectors in an installation remotely, as well as AMX and PJLink support. The PE456USL is also compatible with NEC's NaviSet Administrator 2 software for Windows and Mac for fleet monitoring and control, and you can directly access a control/monitoring panel for the projector from a built-in web page accessible via a browser on a PC that's on the same network. The PE456USL can also be used with MultiPresenter, a free software for Windows, Mac, iOS, and Android that allows screen mirroring of such devices.

As far as installation itself goes, the NEC NP-PE456USL is extremely versatile. It has the Tilt-Free Installation (360-degree rotation) and Portrait Mode common to many laser projectors, as well as extensive Cornerstone Correction. These Cornerstone Correction tools are fantastic for a variety of installations, and I'll get into the applications I believe would benefit most from such a projector in a moment. It has the standard Horizontal and Vertical Keystone Correction, as well as a 4-Corner and 6-Corner Correction. Those two are for minor adjustments to straighten the image. Then, there's Curved Correction, which curves the image outward, beveling at the top and bottom, or you can pinch it inward so that the top and bottom of the image shrink toward each other. This allows for projecting on curved surfaces.

The PE456USL takes things a step further with Grid Image Tune, which sets up a grid of many tiny squares over the image to select and move the image within a small area around the screen—to fine tune even further. With all these features, you're sure to get the projected image to fit your space exactly as you envision it. While playing with these features I immediately thought of art installations at galleries, virtual immersive experiences like the Monet and Van Gogh shows that have been traveling the country, virtual gaming and entertainment (such as simulated golf, baseball, or other sports), or any number of other experiences like it. It seems a particularly good fit for virtual golf

simulators, museums, and galleries, but I could also see it being a good fit for retailers seeking an edge over the competition for in-store advertising and merchandising.



The aspect ratio on the PE456USL can also be changed to suit the screen or surface and application. Though a 16:10 WUXGA projector, you can take it from Full (its natural state), to Wide (cinematic), or even 4:3 (usually seen with XGA projectors). This is just another way the NEC creates a customizable installation experience.

Finally, the PE456USL has an excellent warranty—5 years parts and labor, with Instacare next-business-day exchange.

Performance

Color Modes. There are six color modes offered by the Sharp/NEC NP-PE456USL—five standard modes and one User Mode. Dynamic, the brightest mode, has the expected green tinge to it. As far as brightest modes go, however, it doesn't even touch the hideously ugly mark. It is highly usable in high ambient light circumstances where color accuracy isn't an issue (though I would never use it when projecting films or artwork). Still, I don't see much reason to ever use this mode, though, because User and Standard are both nicely bright, not too far off the mark set by Dynamic mode for battling ambient light, and offer color that is seriously improved.

Standard has quite a lovely warm hue that looks great on skin tones. We lose some differentiation in this between red and orange on the color wheel, picking it back up as orange gets closer to yellow. Not too big of a deal, and as such, I believe this mode makes a good fit for presentations and even some standard TV viewing, such as sports or nature shows, or entertainment/retail applications in business environments, as well as educational content. When testing presentation content, I spent most of my time in Standard mode. User Mode starts off looking like Standard Mode, and allows you to make your tweaks how you will from there. It's a great starting point.

Cinema modes tend to be my favorite in most projectors for their balance of natural color and brightness, and in some projectors they disappoint—though not in the case of the PE456USL. Putting it to the test using visually stunning content from movies including *The Fifth Element*, *Serenity*, and *Ghost in the Shell*, I found the warm tone of this mode to be quite satisfying. Cinema is warmer than Standard in its overall tone, though also with red and orange being more difficult to distinguish from each other. But in the case of Cinema, it was easier to delineate, giving a bit more pop to the images

than if I were to view the same content in Standard. As per usual with many projector's Cinema modes, there is a hint of magenta on the whites.

Two modes best used for classrooms, lecture halls, and even some business or retail applications are Blackboard (Green) and Colorboard. Blackboard (Green) is aptly named, for it is best to project on a blackboard. The color of it is very obviously magenta, as usual for this type of mode, and should look nice on that type of surface. Colorboard is for projecting on colored walls and you can choose the color of the wall in the menu from four choices—red, blue, yellow, or green. The color of this mode is a cool tone, though only the blue choice looked good on my grey wall as I flipped through the colors.

Overall, I was pleased with the performance of the color modes on the NEC NP-PE456USL. I would choose User or Standard and Cinema over all other preset modes, with Cinema being my favorite, and Dynamic could work in a pinch. User Mode may be more your scene if you like tinkering—there's plenty of opportunity to do so within the menu—and it actually measured close to Dynamic in terms of brightness. Cinema mode, by comparison, came in with about 15% less brightness than Dynamic. The best mode for presentations was Standard or actually User mode, which provides more ability to tune vs. Standard mode and is nearly as bright as Dynamic. For video, Cinema is the clear winner.



Presentation Viewing. The PE456UL has a PC-Free Presenting feature via the USB-A port, which looked excellent. It's a plug-and-play scenario, where all you have to do is select the USB-A input, hit enter on the remote when the little USB image pops up in the lower left-hand corner, and voilà—all your files and folders are there to be perused using the navigational controls on the remote. The infographics and presentation slides I use as samples to view are a mix of resolutions, which allows me to see how projectors fare with lower resolution samples. I also tested using two different computers, a lower resolution laptop (1366x768) and my Mac Mini, which was projecting at the projector's resolution, WUXGA (1920x1200). The Mac Mini looked just as good as the USB Presenting function (as expected), and the laptop's projected image was just a tad fuzzy on the text. Consider the resolution of your presentation device when deciding whether to project using a computer via HDMI or the PC-Free Presenting feature.

The PE456USL's lens is sharp. Though powered focus is always preferred for a mounted projector, this one's manual focus is easy to use, smooth, and granular enough to make focusing quick work. Many projectors do tend to fall out of focus over time, however, so when it does, you might need a ladder to fix it.

That said, the projected image does get a little fuzzy around the edges, specifically the corners of the image—something I've seen with short throws, but also know that if you're doing any Cornerstone Correction, you can run into a bit of that as well. In my estimate, it's not a big deal, and most wouldn't notice unless you have text or some detail near the edges of the image that the eyes are directed to. Images otherwise look awesome, and in almost all cases, text is sharp. The overall image quality and color of the projected image is great and close to what I saw on my computer screen in terms of color, just a tad off (the blues on the projected image were a bit lighter), which wasn't bothersome.

To see how a projector does with text, I have a document with a variety of font sizes and colors ranging from 8-point to 24-point—black text on white background, white text on black background, and yellow text on blue background. The yellow text on blue background can get tricky. With the first two, black and white, and vice versa, things were highly readable even at 8-point font from 10 to 15 feet back (further back I'd recommend at least 12-point). However, the yellow text on blue background was fuzzy. In an otherwise sharp projected image, that was the only issue I found—the projector didn't like this unusual color combination, paired with smaller fonts.

As mentioned, the preferred color mode for presentations is User mode, which measured just over claim at 4,806 lumens. Also suitable is Standard mode, or, if you love it and it works for you, you can use Cinema.

Video Viewing. The NEC PE456USL can handle both HD and 4K content. I watched both the HD and 4K versions of *The Fifth Element*, *Serenity*, and *Ghost in the Shell* in Cinema Mode. I also tacked over to Standard, but didn't prefer it for these films at all, as the dark shadow detail and black level performance is better in Cinema. Comparing each film's HD and 4K version, there is a noticeable difference in the sharpness and pop of the 4K content, though be aware that this projector does not process HDR (high dynamic

range). But 4K looks fantastic, even displayed at the projector's native WUXGA resolution. Regular HD is great, too, and if that's what you're watching you won't be disappointed in the quality and sharpness. But if you've got the opportunity to go with 4K content, do it.



Viewed in a dark room, the black levels are, at best, a medium dark grey. That is to be expected at this projector's high brightness and given its intended use. We aren't talking home entertainment or home theater here. I do wish the dark shadow detail would have been a little better, especially in scenarios where there will be ambient light, but it's not bad at all. In darker scenes in *Serenity*, I could make out some details in the clothing of characters and call out shapes in the ship, and in *Ghost in the Shell*, where there are several scenes that benefit from good black levels/dark shadow detail, the PE456USL did fine. Alas, I will always desire the better blacks for movie viewing that you get with good home theater projectors, but I enjoyed watching video content on this projector nearly as much as a typical home entertainment model designed for general use.

This projector is super bright, having exceeded its claim in several modes in my measurements, and coming close in others, so I'll forgive less than perfect contrast. Especially since *Ghost in the Shell* looked incredible the whole way through. Its colors were vibrant and they popped in the city scenes, as well as those featuring the traditional Japanese costuming. Skin tones looked particularly natural in that film. They were natural in the other films as well, but I was struck by how the color correction in *Ghost in the Shell* paired with Cinema mode on the PE456USL. Luckily, Cinema mode fell just under claim at 4,392 lumens while maintaining generally good accuracy.

Conclusion

The Sharp/NEC NP-PE456USL is a good fit for scenarios where installation is particularly challenging, especially environments where a bright, well-balanced image is important and the ability of a short throw projector to eliminate shadows over the projected image is a requirement. This WUXGA projector is 4K-ready, and video content looks excellent in both HD and 4K. The projector is nicely bright, exceeding its 4,500 lumen claim in our sample with 4,920 lumens in its brightest mode. But it's the brightness combined with the projector's tight, short-throw lens, along with placement flexibility from features like 360-Degree Rotation, Portrait Mode, and Cornerstone Correction, that make it stand out for the business, education, museum, retail, golf sim, and even entertainment markets it is targeted at. To top it all off, the PE456USL comes with an excellent warranty—5 years parts and labor, with Instacare next-business-day exchange. All in all, it adds up to a pretty nice, compact laser short-throw with good image quality and a competitive \$2,579 price tag.

Measurements

Brightness. Dynamic is the brightest mode, and would be the most useful for ambient light circumstances based on its reading. However, User mode, which has dramatically

better color and can be tweaked to your liking, measured only 114 lumens less, and I would recommend that as your best ambient light mode.

There are four energy modes that adjust the laser power and brightness. Full Normal represents 100% power and full brightness, Eco 1 reduces brightness by 38% from 100% in any picture mode while Eco 2 reduces brightness 50%. The Normal mode allows the user to dial in the adjustment.

Sharp/NEC NP-PE456USL ANSI LUMENS

MODE	FULL NORMAL	ECO1	ECO2
Dynamic	4,920	3,062	2,460
Standard	4,547	2,407	1,876
Cinema	4,392	2,283	1,734
Blackboard (Green)	2,584	1,398	1,115
Colorboard	4,496	2,407	1,752
User	4,806	2,796	2,177

Brightness Uniformity. The brightness uniformity of the Sharp/NEC NP-PE456USL is 82%, which is quite satisfactory. Visually, I didn't pick up on any hot spots or dimming in the image when viewing presentation or video content.

Fan Noise. Sharp/NEC rates the fan noise of the NP-PE456USL at 37db at full power, 27dB in its Eco modes, using the industry-standard averaged measurement in a soundproof room. Our casual single-point measurements are always higher. Standing approximately three feet back from the table-mounted projector in a quiet room, the ratings were as follows:

Full Normal—42.2 dbA

Eco 1—34.9 dbA

Eco 2—34.2 dbA

Audibly, the projector's fan is not subjectively loud in any mode unless switching from one mode to the next—this is brief. There was a noticeable difference in the speed and hum of the fan when the projector kicked down into its Eco modes. In most installations, the PE456USL will be ceiling mounted, and the fan won't be heard over the usual activity of the room, the drone of the A/C or other ambient room noises. Even in the case where the projector is table mounted, I was not bothered by the fan at Full Normal, or Normal power. For use above 5,577 feet, the projector has a High Altitude mode that noticeably increases fan noise:

High Altitude Full Normal—47.5dBA

High Altitude Eco 1—41.9dBA

High Altitude Eco 2—40.8dBA

Input Lag. The input lag measured in all picture modes for 1080p/60 Hz signals ranged from 49.6 to 50.8 milliseconds. For 4K/30 Hz signals, this increased to a range of 65.9 and 67.2 ms.

For reference, the best gaming projectors have an input lag of 16ms or below, with around 30ms considered pretty good for a projector. The PE456USL's lag of about 50 ms with 1080p/60 is within the range of casual gaming, but it's at the threshold of what's doable and would be noticeable in a first person shooter game, so this would not be one I'd set up for that type of play in a retail/entertainment setting, for example. However, I see this working well enough in an entertainment or amusement setting for a virtual gaming experience, such as those golf sims.

Connections



- Service Port: USB Type B
- USB Memory: USB Type A
- LAN: RJ-45
- HDMI 1 w/ HDCP (v1.4b)
- HDMI 2 w/ HDCP
- Computer In: VGA 15-pin D-sub
- Monitor Out: VGA 15-pin D-sub

- PC Control Port: (D-Sub 9pin)
- Audio 1: Stereo Mini Jack
- Audio Out: Stereo Mini Jack

For more detailed specifications and connections, check out our [NEC PE456USL](#) projector page.