QUALIA

Inside QUALIA 004

Version 3.1; January 16, 2004

A new beginning

There's never been anything like the QUALIA™ 004 High Definition projector. It is the world's first video projector to incorporate Sony's Silicon Crystal Reflective Display (SXRD™) technology. The QUALIA 004 is also exceptional because it displays the full resolution of 1080-line High Definition, with native 1920 H x 1080 V pixels. And this is the first product in the United States to exemplify Sony's QUALIA concept.

Derived from the Latin "qualia," which means quality, Sony's QUALIA movement aims to touch the heart, to evoke strong emotional responses, to challenge the limits of technology and design excellence. The QUALIA 004 is a striking expression of this movement.

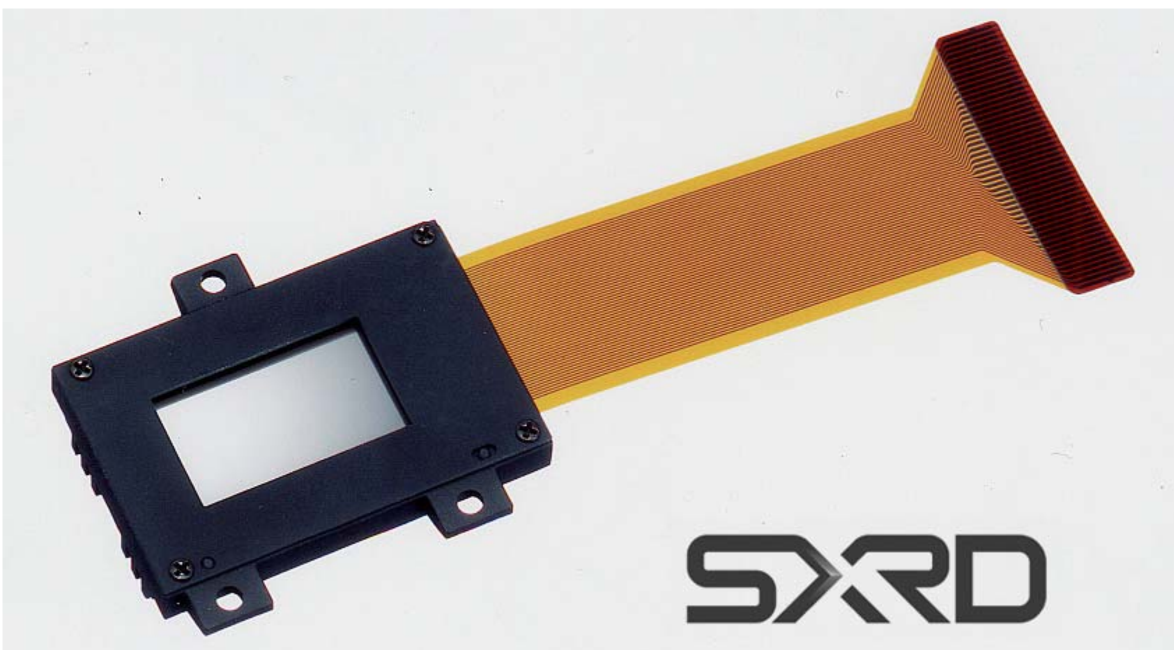
For a new design, the QUALIA 004 already has quite a following. The SXRD panels created a stir when they were previewed in New York in February 2003. A prototype exhibited at the Home Entertainment Show (San Francisco, June 2003) was immediately voted "Best in Show." The final product drew appreciative gasps at the CEDIA Show (Indianapolis, September 2003). In fact, the QUALIA 004 represents a new reference standard—one destined to be scrutinized by everyone from leading custom installers and high-end retailers to magazine reviewers, imaging professionals and home theater enthusiasts.

If you want to understand the QUALIA 004, we invite you to read this paper. But if you want to appreciate the QUALIA 004, there is no substitute for an actual demonstration.

SXRD panels

Not long ago, Cathode Ray Tubes (CRTs) were the dominant technology in video front projection. Today, CRTs are becoming scarce, because the CRTs are responsible for supplying both brightness and resolution. Pushing CRT brightness often compromises resolution—and vice versa. Projection CRTs often operate at the outer edge of their performance envelope, requiring periodic alignment, adjustment and eventual replacement. For this reason, CRTs have largely given way to fixed-pixel panels that supply only the resolution—while an external projector lamp supplies the brightness.

In the United States, literally hundreds of fixed-pixel front projector models are available from dozens of companies. But under the surface, almost every one of these projectors depends on Digital Light Processing™ (DLP™) displays; Liquid Crystal on Silicon (LCoS) panels, of which one type, the Direct drive Image Light Amplifier (D-ILA™) display has been applied to front projection; or High Temperature Polysilicon (transmissive) Liquid Crystal Displays (H-LCDs).

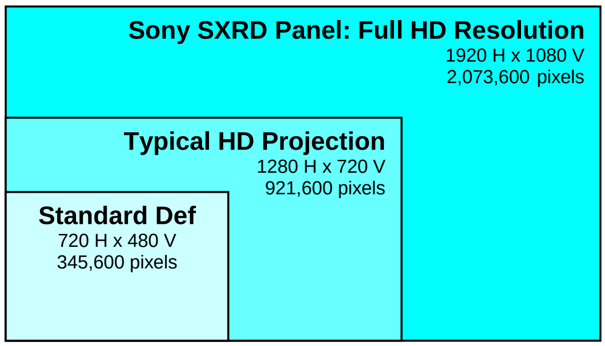


At the heart of QUALIA 004 are three SXRD panels.

Sony's Silicon Crystal Reflective Display represents a significant advance in fixed-pixel front projection. We call it the SXRD™ panel, where the "X" stands for "X-tal," a common abbreviation for crystal. Three SXRD panels, one each for Red, Green and Blue, offer powerful advantages over previous fixed-pixel designs.

Full HD resolution

High Definition is now available via broadcast, cable, satellite and packaged media. Over 1,000 television stations in the US originate free, over-the-air DTV broadcasts, according to the NAB. HD cable service is now available to 60 million US households, according to the NCTA. The DIRECTV satellite service offers Discovery HD Theater, ESPN-HD, HBO HD, HD-Net, HD-Net Movies and Showtime HD channels. And D-VHS tapes provide packaged HD movies.



Compared to many other home theater projectors that are designated "High Definition," the QUALIA 004 offers more than twice as many pixels.

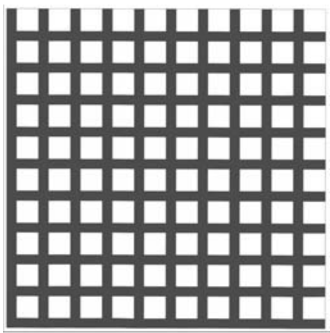
Despite all these programming riches, most video projectors that meet the Consumer Electronics Association's standard for "High Definition" actually fall short of the native resolution of 1080-line HD sources (1920 x 1080 pixels). In many projectors, "downscaling" circuits reduce the 1080-line resolution to fit on a panel that typically offers just 1280 x 720 pixels. That's a 33% reduction in both the horizontal and vertical dimensions.

In dramatic contrast, the SXRD panels achieve full HD resolution, thanks in part to the extremely fine "pitch" of their microscopic pixels. The SXRD pixels are set at a pitch of just 9 micrometers. (For comparison, a human hair is roughly 70 micrometers thick!) This extremely fine pitch delivers 2.4 times the picture density of Sony's own H-LCD panels. The fine pitch enables Sony to put 2,073,600 pixels (1920 x 1080) on an integrated circuit chip surface just 0.78 inches diagonal. So 1080-line HD sources appear in their full glory—never "downsampled."

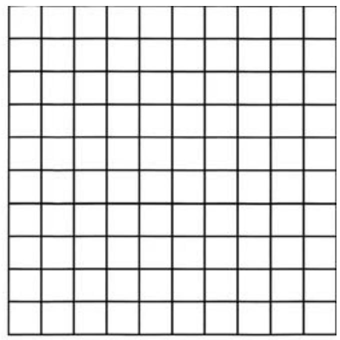
There's more. Some projectors use a single, monochrome display with a rotating color wheel to flash Red, Green and Blue "subframes" onto the screen, one color at a time. Here again, the QUALIA 004 is dramatically different. The projector uses three SXRD panels, one each for Red, Green and Blue. Because the QUALIA 004 displays all the colors, all the time, there are no "subframes," no flashing artifacts in bright areas of the screen and no rainbow artifacts at any time. You get stable, consistent color under all viewing conditions.

Minimal screen-door effect

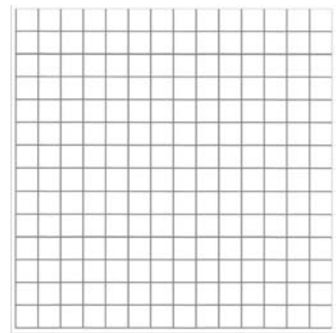
On all fixed-pixel displays, the pixels are separated by gaps that contain no picture information. To generate the effect of a seamless, continuous picture, these gaps should be minimized. Unfortunately, High Temperature Polysilicon LCD panels, which the projector light shines through, require substantial gaps between pixels. While the transistors that drive each pixel are transparent, the DC voltage and addressing connections to the transistors are not. Inter-pixel gaps are required to hide these connections.



Typical H-LCD
1366 x 768 pixels
Fill Factor 50%



Typical DLP
1280 x 720 pixels
Fill Factor 91%

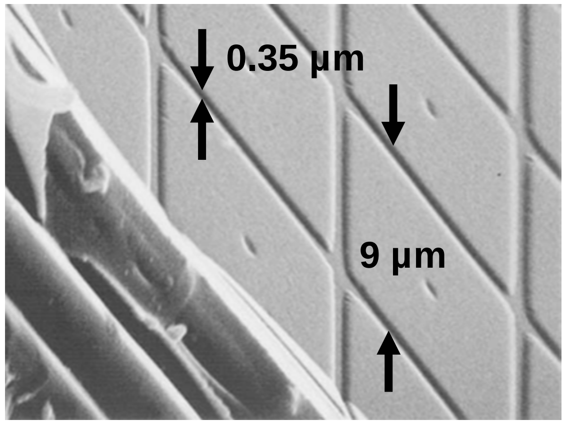


Sony SXRD
1920 x 1080 pixels
Fill Factor 92%

Conceptual view of three projectors using the same screen size. Left: the screen door effect on a typical H-LCD panel. Center: the typical DLP panel is much closer to a continuous image. Right: the SXRD panel is better still, thanks both to its higher fill factor and its 1920 x 1080 native resolution, which results in smaller projected pixels.

On the screen, large inter-pixel gaps become heavy black outlines. It looks as if you're viewing the image through a screen door. While you can always moderate this "screen door" effect by sitting further back from the projection screen, the resulting experience becomes less immersive. That defeats a prime purpose of High Definition: greater detail sustains the illusion of reality when you to sit closer for a more immersive experience.

SXRD technology is different. While light *shines through* H-LCD panels, light *reflects off* the SXRD panel. All connections are hidden in the silicon backplane behind the reflective surface. This arrangement enabled Sony to design inter-pixel gaps just 1/10 the width found in H-LCD panels. While the distance from the center of one SXRD pixel to the center of the next is 9 micrometers, the inter-pixel gap is just 0.35 micrometers! According to Sony's review of the technology available as of December 2003, this is *the world's smallest inter-pixel spacing*.



Photomicrograph of the SXRD panel surface, showing the 92% fill factor, 9 micrometer pitch and 0.35 micrometer inter-pixel gap.

This tight spacing means that a full 92% of the SXRD panel surface is devoted to live image area—with just 8% wasted on inter-pixel gaps. This is called a 92% "fill factor," compared to just 50% for H-LCD and 91% for the typical DLP display.

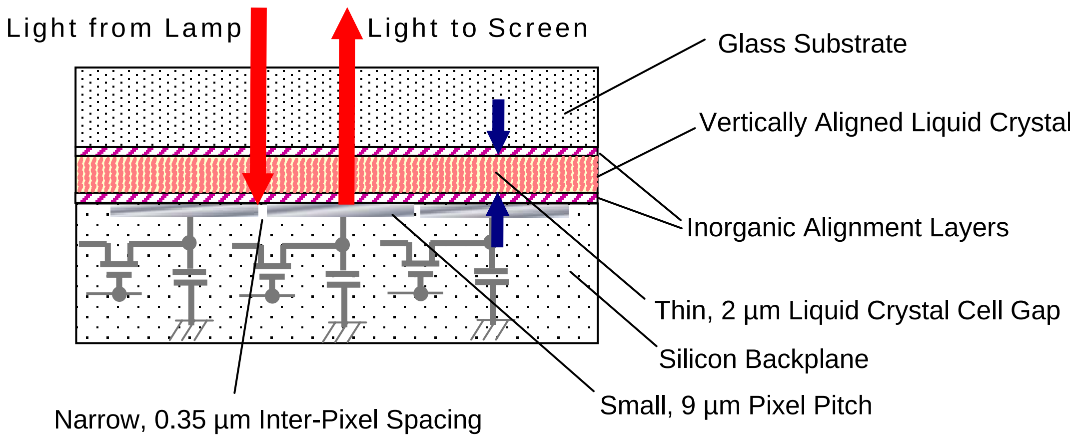
H-LCD DLP SXRD

Simulated TV pictures, showing the "screen door" effect for H-LCD, left. In the center, the typical DLP picture is smoother, but still leaves the pixel structure visible. On the right, the SXRD projection at the same screen size produces a more film-like image.

By the way, the backplane is fabricated with a novel 0.35 micron silicon wafer process and incorporates an innovative drive circuit. The silicon backplane not only controls screen door effect, but also contributes to high pixel density, high resolution, superb uniformity and low crosstalk.

High speed

CRTs and some other displays exhibit very fast response to the dynamic changes in television pictures. So movement is rendered crisply and accurately. Unfortunately, Liquid Crystal Displays are typically not as fast. That's because the liquid crystals are viscous, with consistency more like honey than water. When the transistors command a pixel to change its state, the liquid crystal takes a few milliseconds to respond. In video, these milliseconds are important. Typical 60 Hz interlaced material requires the projector to display a new scene every 16.7 milliseconds. Slow LCD response can blur fast motion, like the outlet pass in a televised basketball game.



Conceptual drawing, not to scale, of the SXRD panel in cross section. Light from the projection lamp enters through the glass substrate at the top, passes through the 2-micrometer Liquid Crystal layer, reflects off the mirrored surface of the Silicon backplane, and passes out through the Liquid Crystal, toward the screen.

Transmissive H-LCDs aren't the only panels that use a liquid crystal layer. So does the SXRD panel. But while light travels through the transmissive H-LCD liquid only once, light passes through the SXRD panel liquid twice, first coming in to strike the mirrored backplane and then reflecting out toward the screen. Because the light passes through twice, the layer of liquid itself can be *half as thick*. At just 2 micrometers, the SXRD panel's liquid crystal layer is not only thinner than with transmissive H-LCD; it's also thinner than with the typical LCoS device. As a result, the thinner layer of the SXRD panel responds much faster than transmissive H-LCD panels. So the picture remains crisp and clear, even during fast-action sports like basketball and hockey. Specified response is 5 milliseconds for the total of rise time and fall time (tr + tf).

Sony also implements a novel production method to maintain the 2-micrometer layer thickness. Spacer/sealer outside the perimeter of the image area establishes highly precise gap tolerances while maintaining the integrity of the video picture.

High contrast

Most H-LCD projectors use Twisted Nematic (TN) liquid crystal, which normally displays white. Here again the SXRD panel is a departure, using Vertically Aligned liquid crystal, which normally displays black. Vertical alignment and the thin, 2-micrometer layer combine to create superior picture contrast. Contrast is measured as the ratio between the brightest possible bright and the blackest possible black. The contrast ratio of the SXRD panel alone, when measured with a conoscope, is better than 3000:1—a threefold improvement over previous designs.

Long life

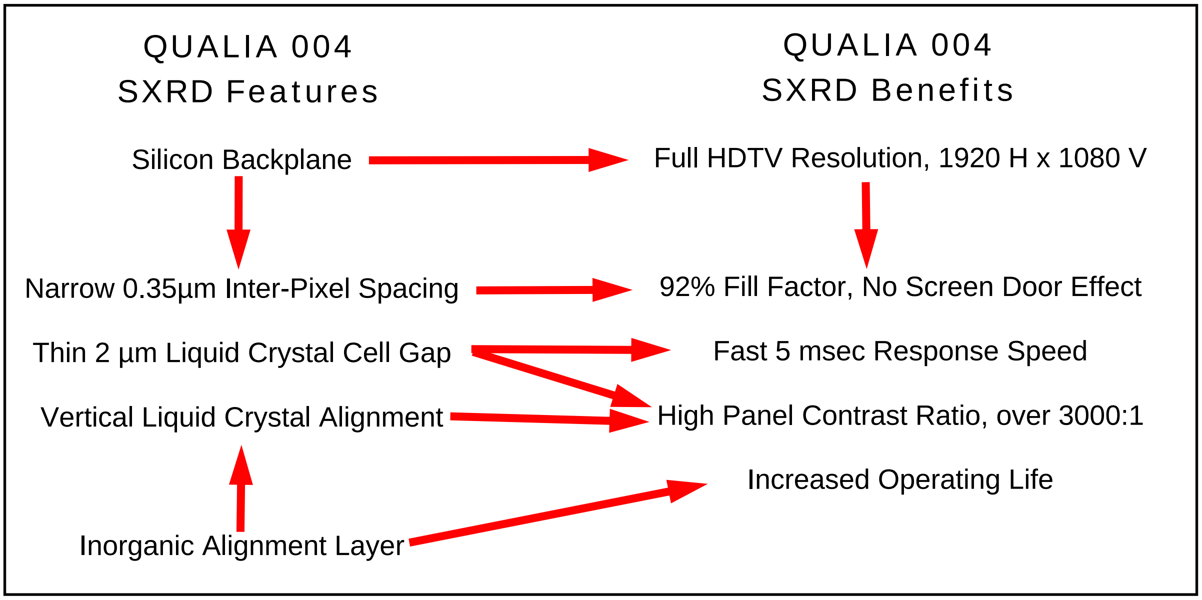
CRTs have phosphors that are subject to burn-in when an image stays on the screen too long. Projection CRTs are particularly susceptible, because they run at higher output to achieve high brightness. Fixed-pixel projector display panels reduce the problem, offering long service life. And the SXRD panel is particularly robust.

Two thin sheets of material hold the liquid crystal in alignment. Typically this material is organic polyimide film. This generally works well but has less than optimal operating life in the stressful, high-heat environment of a video projector. Sony's inorganic thin film alignment layer not only maintains vertical liquid crystal alignment but also exhibits exceptional thermal stability and maximizes the operating life of the SXRD panel.

A new benchmark

Compared to even the finest high-end digital home theater projectors, the QUALIA 004 with SXRD panels sets new standards for the two most important parameters of picture quality: resolution and contrast ratio. The SXRD panels also achieve superb freedom from screen door effect, high response speed and long operating life. In addition, the projector's three-panel design delivers exquisite, ultra-stable color.

In the long term, we expect that SXRD technology will prove to be an important alternative in video projection, earning a place not only in home theaters, but also in corporations, schools, colleges, government agencies and large-venue installations.



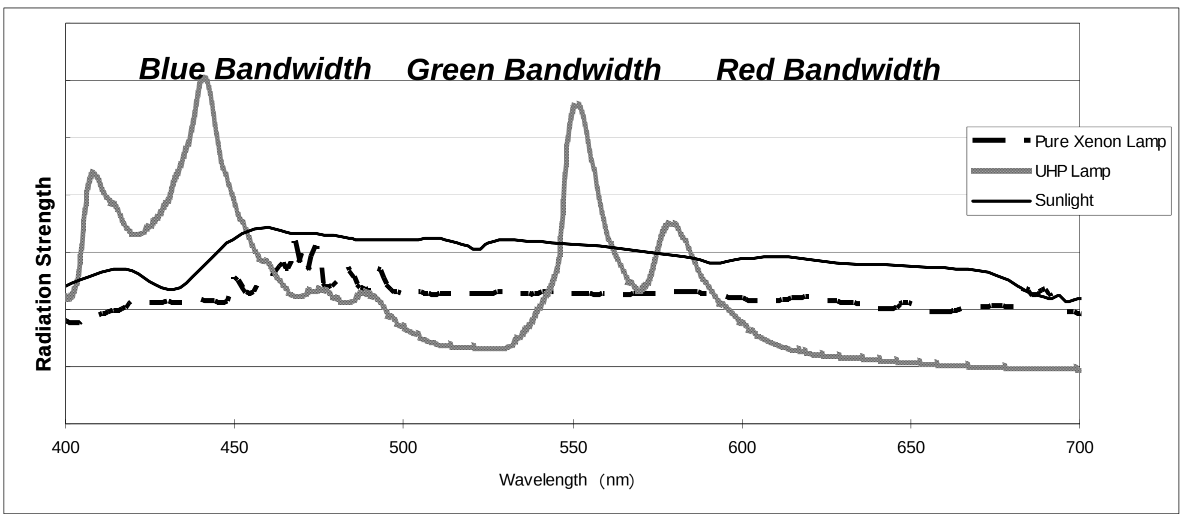
For the SXRD panel of the QUALIA 004 projector, even the benefits have benefits. Full HDTV resolution helps minimize the screen door effect.

Of course, there's much more to projector performance than just the display panel. In fact, every aspect of the QUALIA 004 projector—lamp, optical engine, lens, panel driver, and chassis—is better than it has to be.

Pure Xenon lamp

Projector lamps are equal parts chemistry and physics, involving high pressure, electricity, light and heat. The goal is to produce a bright, white light, as close as possible to sunlight. Proper illumination is like proper frequency response in a high fidelity loudspeaker: you don't want frequency peaks and dips. And you don't want to emphasize the high frequencies at the expense of the low frequencies.

The typical projector lamp is an Ultra High Pressure (UHP) design that has unwanted peaks in the blue and green frequencies and a relative deficiency in the reds. While some early UHP projectors used this light without correction, contemporary designs use filters to approach the proper spectral content. These filters correct the color balance to some degree, while sacrificing overall light output.



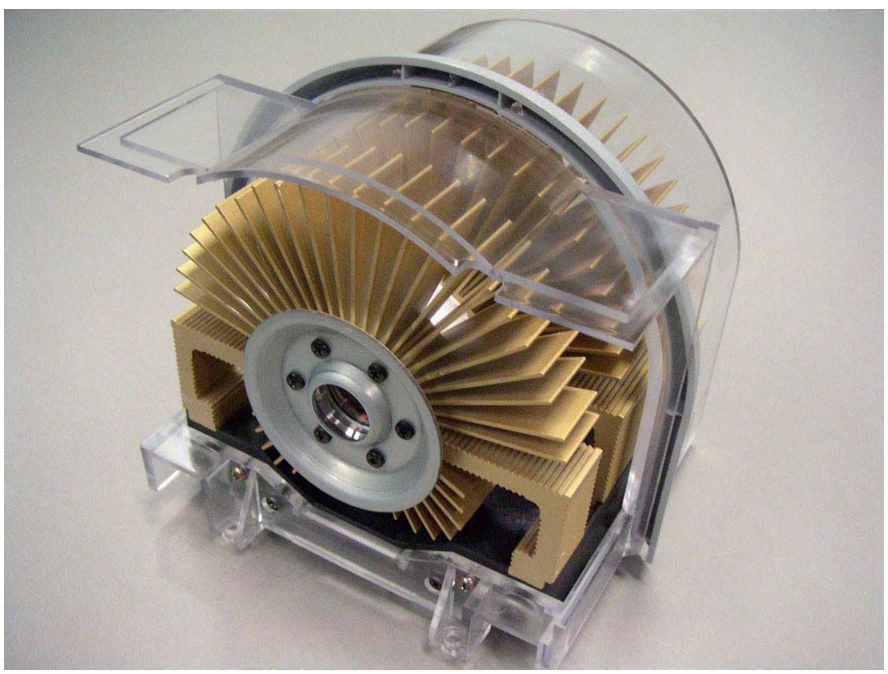
Projector lamps attempt to match the spectral content of sunlight (black curve). Common UHP lamps (gray curve) exhibit unwanted peaks in the blues and greens, with a relative deficit in the reds. The pure Xenon lamp (dashed curve), is obviously much closer to the ideal.

Obviously, a better solution would be to start with a lamp that's balanced to begin with. That's why movie theaters use Xenon lamps. And that's why the QUALIA 004 uses a pure Xenon lamp.

Pure Xenon lamps are quite rare. For example, some Xenon automotive headlights contain as little as 1.5% Xenon, with Mercury and Metal Halide as the primary constituents. These bulbs can operate at 35 watts. In contrast, the QUALIA 004 lamp uses Xenon as the principal element and operates at 700 watts.

An automotive headlight bulb, left, can contain 1.5% Xenon and can operate at 35 watts. The QUALIA 004 bulb, right, uses Xenon as the principal element and operates at 700 watts.

Frankly, we don't expect pure Xenon lamps to become commonplace in home theater projectors. They're costly, and they impose severe requirements on the projector's power supply and cooling management. Sony's pure Xenon lamp is cooled by the radial fins of a massive aluminum heat sink, treated with a special coating to promote the most efficient radiation of heat.

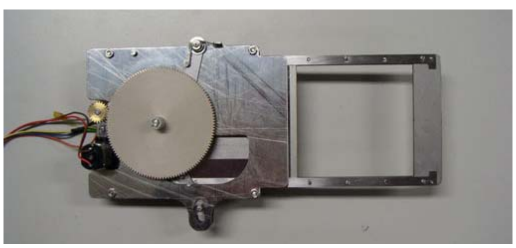


The pure Xenon lamp occupies the center of this massive aluminum heat sink, which keeps the lamp cool. In fact, heat sinking, cooling, air flow and fan noise were major considerations in the QUALIA 004 chassis design.

Optical Engine

Another system that has a profound impact on picture quality, the Optical Engine provides the light path from the pure Xenon lamp to the projection lens. The first stage of the Optical Engine is a high-performance lens that gathers white light from the pure Xenon lamp and focuses it onto the SXRD panels.

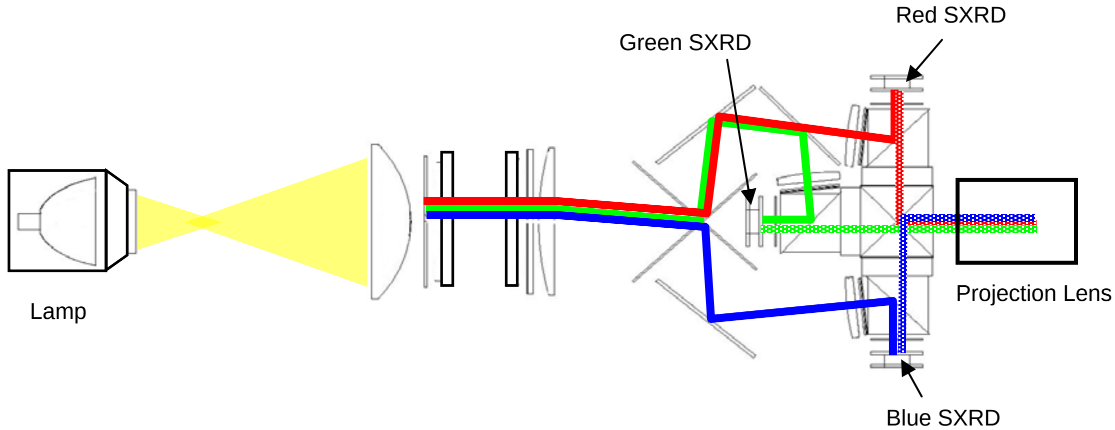
Next, an optical iris regulates the flow of light, as part of Sony's Cinema Black Pro system. Three iris positions (Off/1/2) and two lamp wattage settings (Low/High) enable you to match projector performance to room ambient lighting. In a perfectly darkened room, screen brightness becomes relatively less important and contrast ratio becomes paramount. The proper setting would be "Low" wattage and an iris position of "2." In a brightly lit room, high contrast is not possible and the urgent need becomes maximum brightness. In that case, the proper settings are "High" wattage and an iris position of "Off." In addition, the Cinema Black Pro system accommodates screens of different sizes, enabling you to emphasize brightness for larger screens and contrast for smaller screens. All told, the Cinema Black Pro system gives you six settings to manage brightness and contrast.



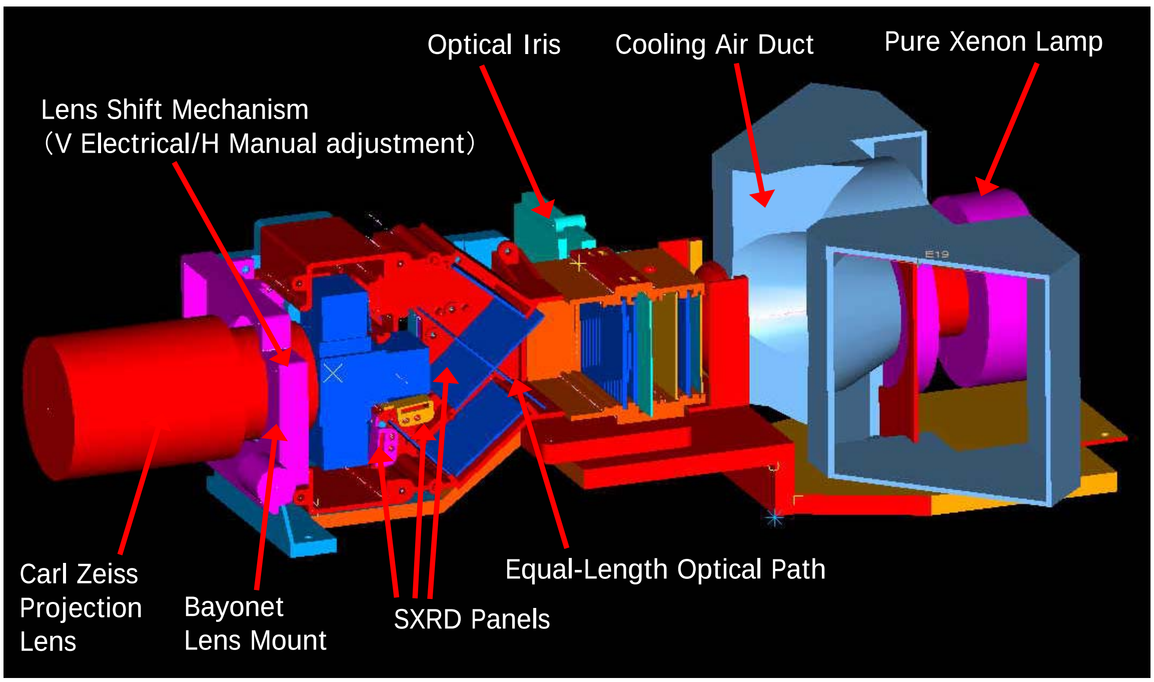

The optical iris in the "Off" position, left, and the "2" position, right.

After the optical iris, high-precision mirrors and prisms divide the light into Red, Green and Blue components; focus light on the three SXRD panels; combine the reflected light; and carry it to the projection lens. Not only are the SXRD panels hermetically sealed to protect from dust contamination, so is the prism assembly. All told, the optical engine achieves better than 3000:1 contrast ratio, when mirrors are substituted for the SXRD panels.

When Red, Green and Blue light is separated, minor differences in the optical path lengths can cause subtle color shading on the screen. These path-length differences are common in video projectors. And there are ways to compensate for the unwanted color shading. But Sony engineers were determined to solve this problem at its source. They carefully designed the Red, Green and Blue optical paths for precisely equal length. So on-screen colors remain true to life.



To maintain neutral color balance, the QUALIA 004 Optical Engine establishes an equal-length optical path for Red, Green and Blue light alike.



This overview of the Optical Engine shows the locations of the pure Xenon lamp, the optical iris, the three SXRD panels and the projection lens.

The last task of the Optical Engine is to support the projection lens (required, not included). The bayonet mount ensures highly precise, highly secure lens mounting. To accommodate a wide variety of installations, Sony provides comprehensive lens shift controls, with motorized vertical control and manual horizontal fine-tuning.

Carl Zeiss® lenses

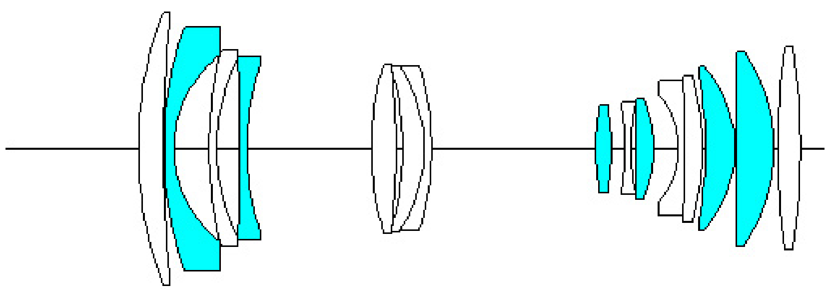
Movies are shot by cinematographers who care passionately about cameras, film stocks and the new digital cinema technologies. But if you want to see a cinematographer's face light up, ask about their choice of "glass," or lenses. Great lenses provoke near-religious fervor because lenses can make or break the picture quality. Lenses are responsible for maintaining resolution, contrast, even illumination and consistent color from the center of the picture all the way out to the corners. With so much at stake, cinematographers are notoriously finicky about the lenses they shoot with. In this context, cinematographers have hailed Carl Zeiss lenses as "perfection," "a benchmark," "amazing" and "the best I have ever seen."

Just as lenses have a profound impact on the captured image, they're crucial to the resolution, geometric accuracy, color fidelity and consistency the projected image. And just as cinematographers choose Carl Zeiss, Sony chose Carl Zeiss lenses for the QUALIA 004.

These three Carl Zeiss zoom lenses represent the state of the art in optics.

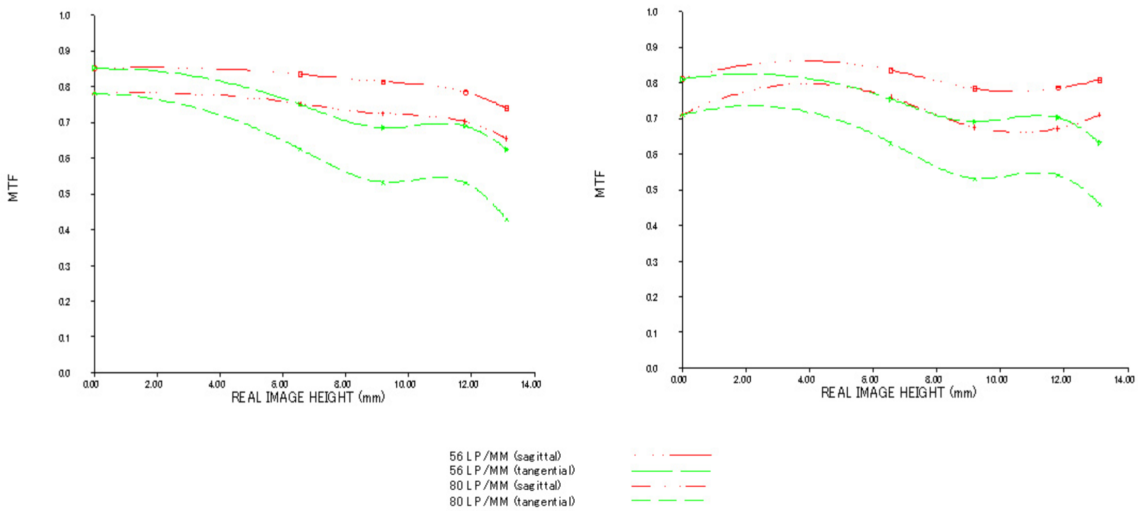
Even among the elite of Carl Zeiss lenses, the three Vario-Sonnar® zoom lenses available for the QUALIA 004 are remarkable.

- Every lens element is glass.
- All three lenses achieve consistent brightness, ultra low chromatic aberration and ultra low distortion.
- 80% of the elements are designated Low Dispersion (LD) or Extra-Low Dispersion (ED)—crucial for maintaining image contrast. Where some 35mm SLR lenses might use one or two ED lens elements, the QUALIA 004 lenses use a minimum of *five*.
- Multiple Anti-Reflective (AR) coatings help maintain contrast.
- The bayonet mount enables highly precise, highly stable interface to the projector.
- The lens barrel is metal with a high-strength aluminum ring.
- All lenses offer power focus and power zoom.
- Finally, each and every production lens in this series is individually tested for Modulation Transfer Function (MTF).



Composition of the Carl Zeiss Vario-Sonnar 25-33mm wide zoom lens. Every lens element is glass. While some 35mm SLR lenses may use two Extra-low Dispersion (ED) elements, this lens uses six, indicated above by color shading.

MTF is an extremely stringent measurement that assesses resolution and contrast simultaneously. Resolution is measured in LP per millimeter. Modulation is expressed on a scale from zero (no contrast) to 1.0 (full contrast). Optics technicians conduct several MTF tests on each end every lens in the production run. The technicians examine performance not only at screen center, but all along the height of the screen. The tests are 56 LP/mm sagittal, 56 LP/mm tangential, 80 LP/mm sagittal and 80 LP/mm tangential. For an added measure of confidence, the tests are conducted at both full Wide and full Tele zoom positions. In total, some eight MTF graphs are plotted per lens. We know of no other home theater projection lenses so thoroughly engineered or so stringently tested. As a result, we don't need to assume that a delivered lens performs beautifully; we know it.



These eight MTF graphs confirm the performance of a 25-33mm wide zoom lens at full Wide (f = 25mm, left) and full Tele (f = 33mm, right). Optics technicians run this series of tests not just for prototypes, but for each individual lens delivered to a QUALIA 004 customer!

The three lenses are carefully chosen with slight overlaps in the angle: 25-33mm, 32-45mm and 44-61mm. In this way, installers can cover a wide range of rooms and situations without any gaps.

Lens	Designation on Lens Front	Designation on Lens Body	Throw Distance for 100-inch 16:9 Screen	Vertical Shift Range
VPLL-ZP310 Wide Zoom x1.34	Vario-Sonnar 2,9-3,5/25-33	TD/SW=1.43-1.86	10' 5" to 13' 6"	0 to 0.5 screen height
VPLL-ZP400 Mid Zoom x1.43	Vario-Sonnar 2,9-3,4/32-45	TD/SW=1.86-2.58	13' 5" to 18' 9"	0 to 0.5 screen height
VPLL-ZP550 Tele Zoom x1.4	Vario-Sonnar 2,9-3,5/44-61	TD/SW=2.57-3.50	18' 8" to 25' 5"	0 to 0.75 screen height

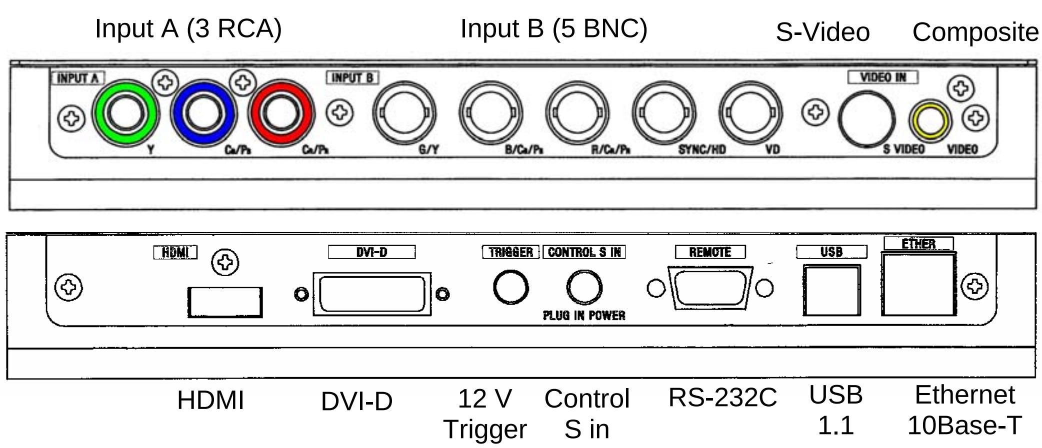
The three lenses cover a continuous range of throw distances without any gaps. For the inscription on the lens body, "TD" refers to Throw Distance while "SW" refers to screen width for a 16:9 image.

Electronics

Inputs

The projector accommodates a wide of range analog and digital video inputs. Acceptable video line rates include 480i, 480p, 720p and 1080i. The DVI-D input also accepts 1080p. The QUALIA 004 accommodates computer signals at line rates from 19 to 72 kHz and frame rates ranging from 48 to 92 Hz. Composite video color from NTSC, PAL, SECAM, NTSC 4.43, PAL-M and PAL-N sources is automatically detected and decoded, with Sony's 3D Digital Comb Filter used for NTSC and NTSC 4.43 material. For cleaner cable management, analog inputs are grouped on the lower left, while digital inputs are on the lower right.

While most home theater projectors must down-scale 1080-line High Definition signals, the QUALIA 004 actually up-scales all video inputs other than 1080-line HD to the native 1920 H x 1080 V pixel count of the of the SXRD panels. Sony's Digital Reality Creation™ Multi-Function scaling circuitry has a choice of interlace mode for material shot on interlaced video and progressive mode for material shot on 24P High Definition and film. Sony's CineMotion™ 3-2 reverse pull-down technology automatically detects the 3-2 cadence of 24-frames-per-second material—preserving the integrity of the original frames.



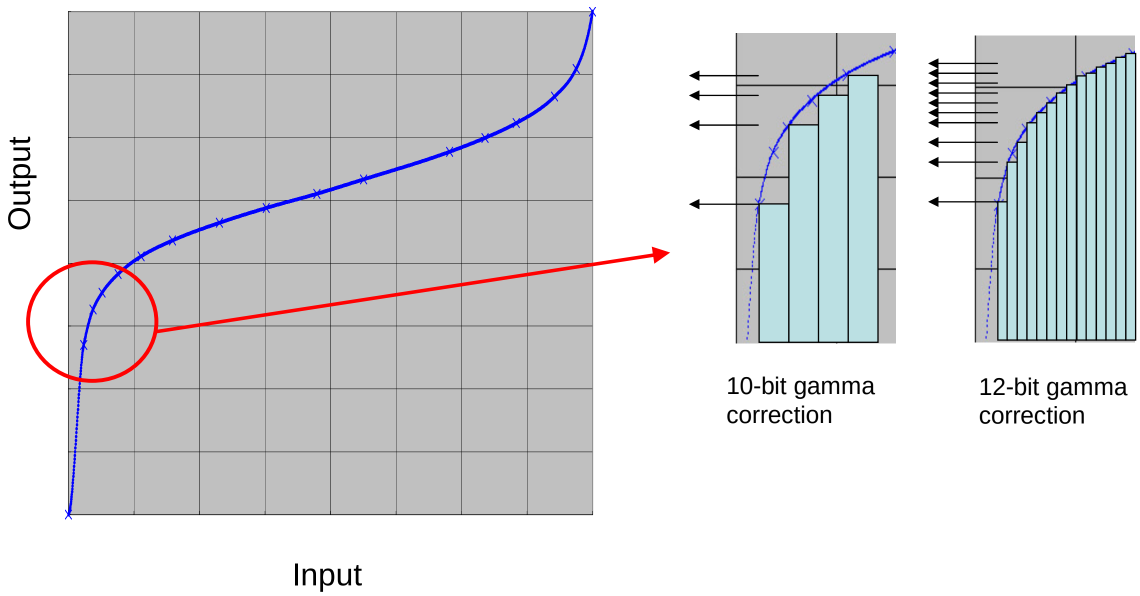
For cleaner cable management, analog inputs are grouped at the lower left of the projector chassis, while digital inputs are at the lower right. The QUALIA 004 projector accommodates a full range of input and control interfaces.

The projector includes no facilities for audio, which must be handled by an outboard system.

3D Gamma correction

All electronic displays "map" the grayscale of the input signal to the requirements of the display and the viewing environment. This mapping is called gamma correction. Incorrect gamma will "crush" the blacks or the highlights, diminishing the detail. Perfectly adjusted gamma will reveal the full dynamic range of the input, without losing any detail from the brightest highlights to the deepest shadows.

The QUALIA 004 projector incorporates 3D digital gamma correction of superlative precision, completeness and control. Sony's 12-bit process yields four times as many discrete levels of gray, compared to conventional 10-bit circuits. This is crucially important in shadow areas, where some projectors generate false "contours" instead of subtle shading. Thanks to 12-bit gamma correction, shadows appear more continuous, more subtly graded, more like life.



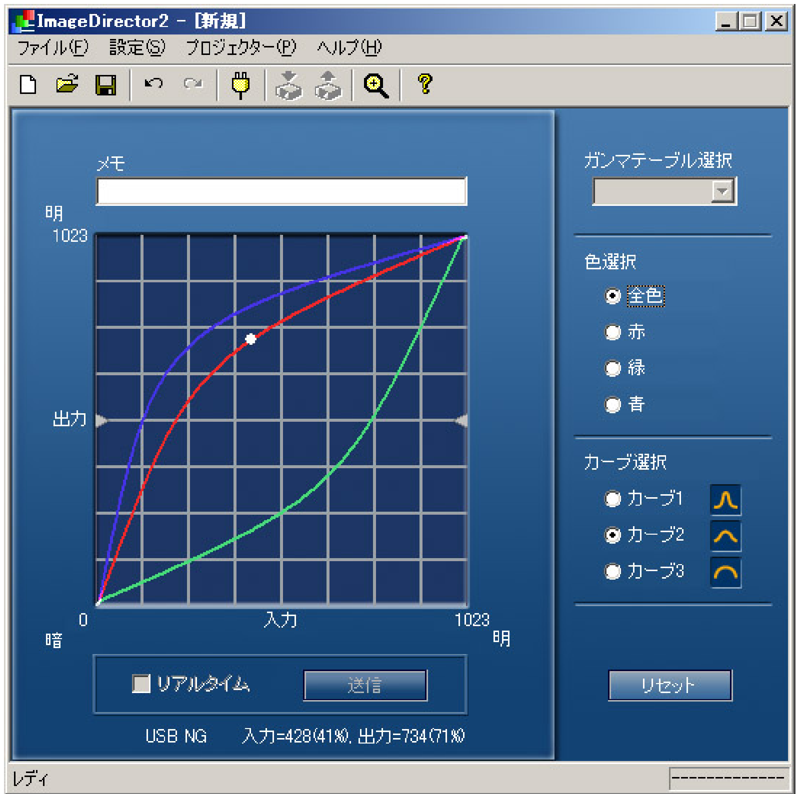
The typical 10-bit gamma correction (center) cannot match the subtle shadings of Sony's 12-bit correction (right). You'll see shadow detail that's more subtle, more lifelike.

Equally impressive is the comprehensive way that Sony applies gamma correction to the image. Each projected frame receives gamma correction at over 6,000 individual points.

Image Director 2 software

Controlling such powerful gamma correction is far beyond the capacity of a simple knob or on-screen slider. For this reason, Sony supplies each QUALIA 004 projector with Image Director 2 software. This enables the installer to use a

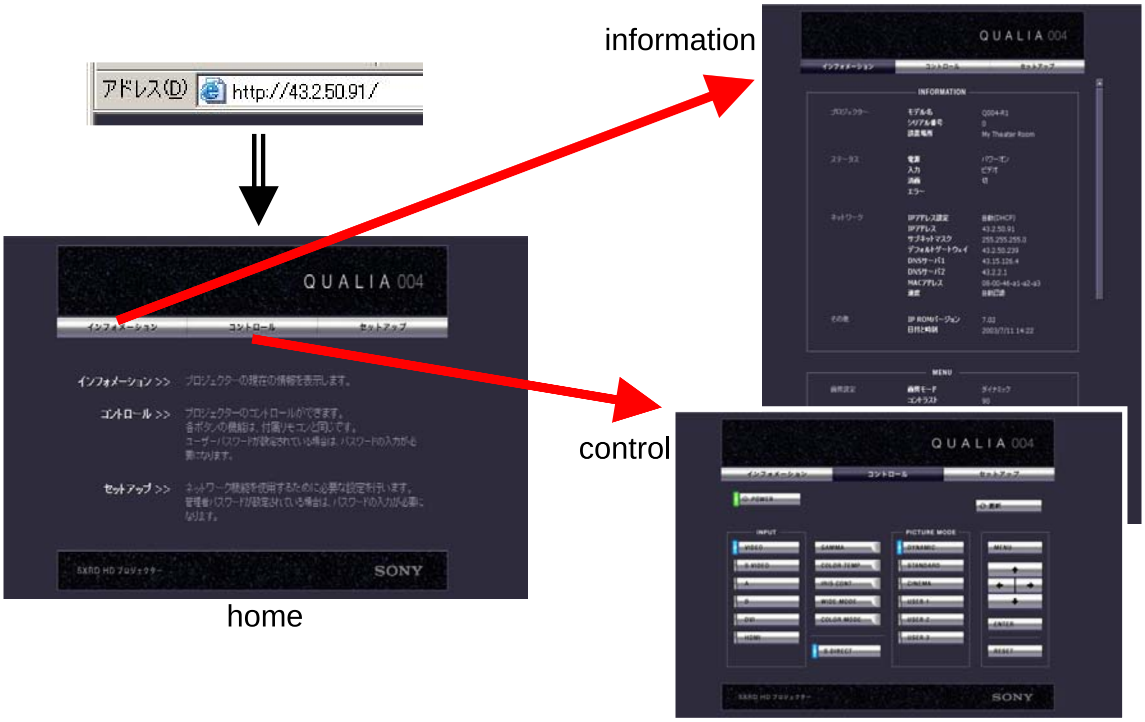
Windows® PC to apply comprehensive gamma correction via the projector's USB or RS-232C interfaces. And the Image Director 2 software will enable installers to save settings from one projector and apply them to another—a crucial advantage in multi-projector installations. (To ensure optimum performance, use a professional Sony authorized custom installer.)



Each QUALIA 004 projector is supplied with Image Director 2 PC software. Here is individual adjustment for Red, Green and Blue gamma curves.

Networking

With the QUALIA 004, Sony custom installers have the means to monitor the health and performance of the projector, actually anticipating technical problems before they occur. The projector comes equipped with a built-in web server and a 10/100Base-T Ethernet port. This enables the installer to have password-protected web access to monitor the projector's operating status, including bulb and filter condition and control settings. So if a customer has an issue, the installer can not only review the projector's status, but actually switch the projector's inputs and settings without leaving the office!



Sitting at their office PCs, using standard web browsers, installers can access the home page of each QUALIA 004 projector. Password-authenticated users can see comprehensive status information (upper right) and even operate the projector's controls (lower right).

This reporting screen enables the installer to set the report intervals, report types and the email and pager addresses of up to four recipients.

Simple Network Management Protocol (SNMP) alerts also enable the QUALIA 004 to notify the installer whenever operating parameters fall below an established threshold. In this way, the installer can be alerted to the need to maintain the projection lamp or filter before the customer notices anything amiss. Automatic notifications can be sent out by email or pager alert. The projector can even send out regular status reports, for example, once a month, to as many as four email addresses, with individual report intervals for each address.

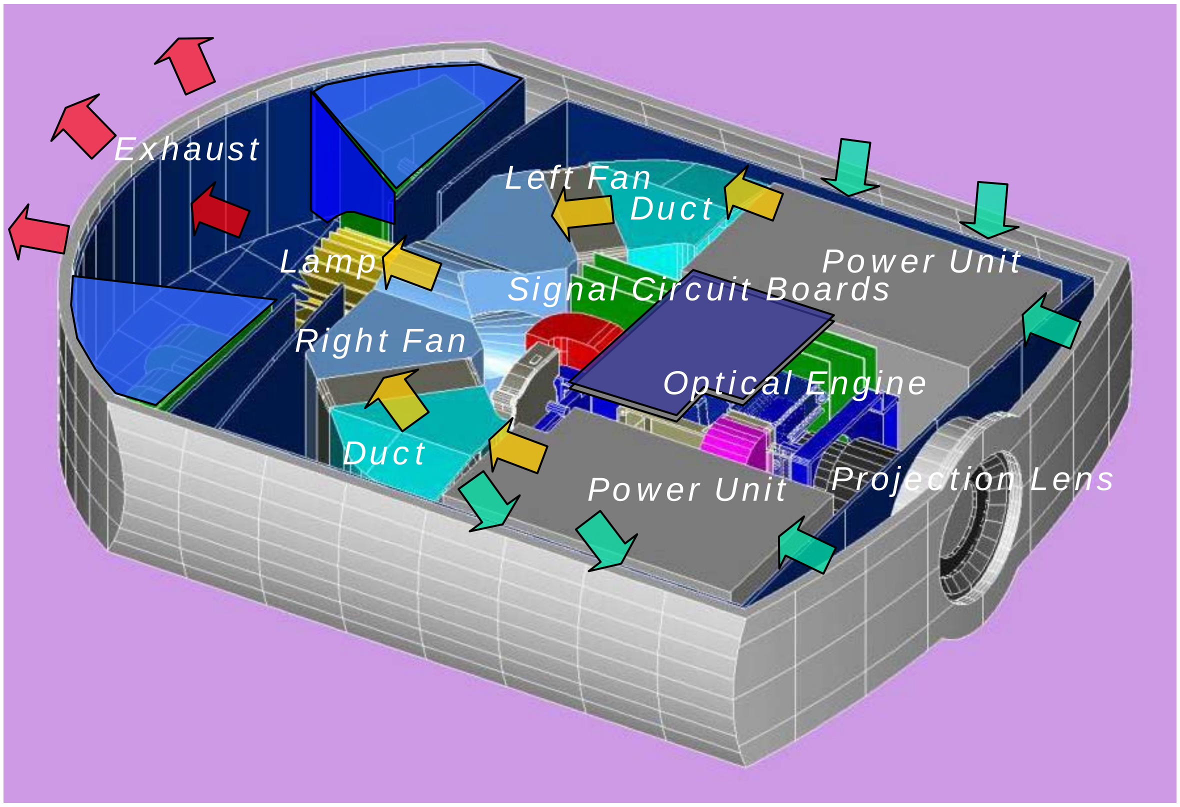
The QUALIA 004 is also compatible with Sony PJ Talk software, which supports the SDCP protocol.

Design

The Sony QUALIA project focuses on human feelings and emotional responses. This approach has inspired every aspect of the QUALIA 004 industrial design. From the chassis to the remote control to the on-screen graphics, every element is designed to elicit surprise and delight.

The main body of the projector is surrounded by an "exoskeleton."

As a class, video projectors make far less of a design statement than the images they project. However, the QUALIA project demanded a chassis of exceptional elegance. The projector is designed in two pieces on either side of the pure Xenon lamp heat sink, itself an object of beauty. The chassis is unified by an "exoskeleton" that quietly and efficiently channels cooling air from the front to the back. Quiet air flow is also assisted by the location of the cooling fans midway between the air intake and exhaust. The choice of two fans running at half the speed also reduces ambient noise. Finally, the cover plate is made out of a distinctive "foamed" aluminum some 5 mm (0.2 inches) thick. This foamed metal structure helps suppress fan noise, while it imparts a touch of elegance.



The exoskeleton is more than beautiful. It also serves to direct cooling airflow and limit operating noise.

The chassis also includes refinements like a small, Organic Light Emitting Diode (OLED) display that confirms control settings, delivers status messages and flashes alerts. The OLED is complemented by an illuminated Sony logo.

An OLED display on the chassis confirms control settings.

Sony expedites hands-on installation with a pop-out control panel on the projector chassis. This means installers don't need to get off a ladder and search for the wireless remote control. The panel is also illuminated, for handy adjustment in a darkened room.

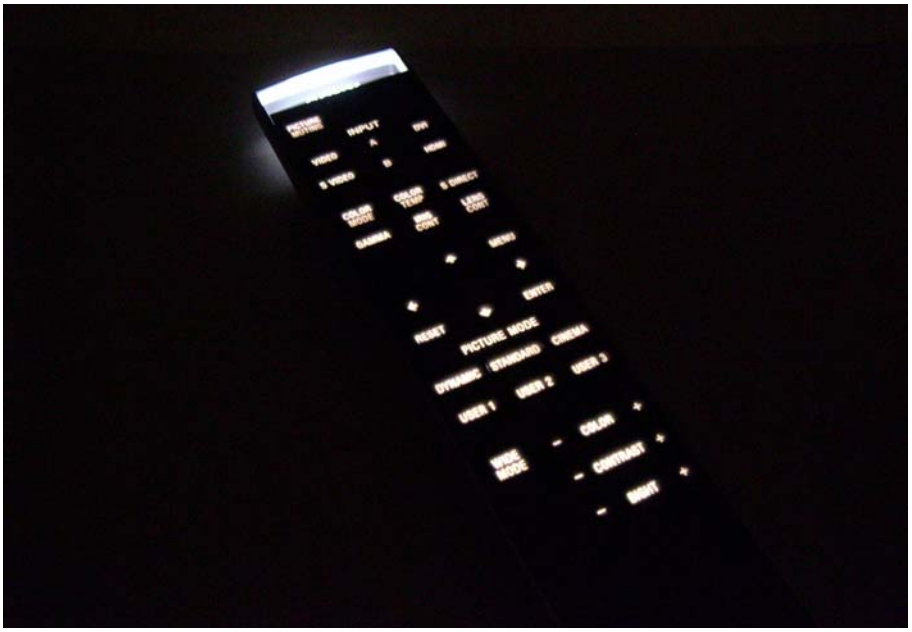
You can pop out this discreet control panel during installation and fold it back into the projector chassis at all other times.

Although most owners won't ever see it, the chassis also features an aluminum bayonet mount for the optional Carl Zeiss lens (required). In addition to high geometric precision, the bayonet mount has the satisfying "snick and click" of a fine, 35mm SLR camera.

As you would expect, Sony thought carefully about the management of input cables, creating an optional ceiling mount cover that hides the cables completely.

The optional ceiling mount cover hides the input cables, to maintain the projector's uncommonly clean, elegant appearance.

The concern for design extends to the QUALIA 004 Remote Commander® remote control. When you pick up the remote, motion sensors turn on the illumination, supplied by white LEDs.



Presenting Sony's first remote control self-illuminated by white LEDs.

Finally, the projector features a unique Graphic User Interface with color menus, easy-to-follow icons and a translucent menu background that you can change according to viewing conditions.

You can change the menu background color to match viewing conditions.

Specifications

Display Panel
Three 0.78-inch SXRD (Silicon X-tal Reflective Display) panels with 1920 H x 1080 V (2,073,600) pixels resolution; total approximately 6.22 Mega Pixels

Lamp
Pure Xenon Lamp

Screen Size
40 – 300 inches diagonal (16:9 aspect ratio)

Color Format
NTSC, PAL, SECAM, NTSC 4.43, PAL-M, PAL-N; Auto/Manual Switchable

Compatible Signals
15 kHz Video, DTV (480i, 480p, 720p, 1080i), 1080p through DVI-D input
Computer signals (fH: 19 – 72 kHz, fV: 48 – 92 Hz)

Inputs

Video Input
Composite Video x 1 (RCA jack)
S Video x 1 (DIN jack)

Component Input
1 (3 RCA jacks)

RGB/Component Input
1 (5 BNC jacks)

DVI-D Input
1

HDMI Input
1

Control Interfaces

Control S
1 (Stereo Minijack)

12 V Trigger
1 (Minijack)

RS-232C Remote
1 (D-sub 9 pin)

Ethernet
1 (RJ-45 jack, 10Base-T/100Base-TX)

USB
1 (Mini USB-B: USB1.1) for gamma correction

General

Power Supply
AC 100 – 240 Volts, 50/60 Hz

Power Consumption
Maximum: 980 watts
Standby mode: 7.8 watts

Dimensions (WHD)
23-1/2 x 8 x 29-3/8 inches
(597 x 201 x 745 mm)

Weight
Approx. 88 lbs. (40 kg)

Supplied Accessories
RM-PJR1F Remote Commander® remote control
Image Director 2 gamma correction software (CD-ROM)

Required Option
One Carl Zeiss® Vario-Sonnar® lens is required, not supplied:
VPLL-ZP310 Wide Zoom x1.34; 25 - 33 mm
VPLL-ZP400 Mid Zoom x1.43; 32 - 45 mm
VPLL-ZP550 Tele Zoom x1.4; 44-61 mm

A final word

From the Extra-Low Dispersion elements of the Carl Zeiss® lens in front to the 700 watt pure Xenon lamp in back, from the sub-micron level genius of the SXRD™ panels to the elegance of the exoskeleton chassis, the QUALIA 004 is without peer. You owe it to yourself to see a demonstration.

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