



Runco LS-5 DLP Front Projector

Terry Paullin

This may be the first time "Runco" and "very affordable" have seen each other in the same sentence. "High quality" is a familiar sentence, pal, but so are retail numbers well into five digits. But so be it. The new LS-5 DLP front projector DOES carry the Runco logo and logs in at a tick under \$7,000. With anything close to its performance in the marketplace sporting at least one extra digit in the price tag, this offering should be a no-brainer for anyone waiting to see what's around the corner. Wait no longer. Pristine pixels for minimum dinero are here at last. But now I've gone and spilled the beans ...

First, a minimum of mundane details.

The LS-5 design is a bit ... uhh, odd. It's round. Opinions will vary, as personal tastes do, but the truth is it will soon be upside down on your ceiling, so if noticed at all, it will likely elicit a "hummm," which will quickly be replaced with a "woow" if there is any image at all coming out of the lens. Like most current-generation DLPs, it's small, lightweight (22 pounds), and relatively quiet. It has a 6-segment color wheel, an optional short throw lens, and the replacement lamp is \$500 and should last about 4,000 hours in "green" mode.

When the 240-watt lamp is set to full bright (standard) mode, the exhaust can be a bit warm, so if table mounted, you may want to avoid sitting screen left.

There ends the similarity with the rest of the under \$10K crowd.

Set-Up

It's about as easy as it can get. Vertical and horizontal lens shift must be accomplished mechanically with an Allen wrench, but I actually prefer it that way. Non-motorized controls equal fewer moving parts, less cost, and greater reliability. And besides, you only have to set them once. Ditto for the manual focus and zoom. Be sure and take advantage of the built-in, single-pixel test

grid for adjusting focus. That's it. Now you are ready to go through the user menu choices with your favorite calibration disc in the player, or just call your friendly ISF calibrator ... :-)

Remote

The remote control has just the right stuff. That is to say it doesn't attempt to control the sun, moon, and stars and your whole-house lighting. Refreshing. Button cluster is rampant on most of the competition. This one has discrete "on" and "off." It has five discrete, assignable sources. It has three assignable user (picture control) memories, including a password-protected ISF day/night mode. You can also "freestyle" with direct contrast, brightness, sharpness, gamma, over-scan, and noise reduction buttons. Just remember where the calibrated settings are once Uncle Merle has gone home. There is also, of course, the obligatory cursor wheel for menu navigation and a sequential aspect ratio button ... and, oh yeah, it's backlit. This remote also has a very cool feature that custom installers will appreciate. If you hold down the "light" button for five seconds, it activates a small light on the back of the projector just above the input connections. If you are up on a ladder near the ceiling, trust me, you don't want to dedicate half of your hands to a flashlight. Nice, unique touch!

As efficient as it is, as with most remotes on the coffee table, its functionality will likely get transferred to some user-friendly touchscreen in any competent custom installation.

Menu

I believe the user menu for the LS-5 is the most comprehensive I have seen. The adjustments offered, or data displayed, is available under six general headings.

The first meaty one, "Main," will give the average user everything he/she needs to get through the \$29 disc calibration. Standard user



Shown: LTX 500v Projector



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adjustments that replicate those on the remote can be found there. "Color" and "Tint" are only available on analog video inputs, like "component," "S," and "composite." For any incoming HDMI, the factory knows best. Having set the basics, one can go on to several flavors of noise reduction. Selecting "Simple" lets the user dial in up to 200 "units" of NR. I found going to 25 offered a bit of a cleanup. NR, of course, is a moving target. What works one day on a given channel, may not work on an adjacent channel—and what works for those two, may not tomorrow. You are truly at the mercy of the content and who's controlling the MPEG compression knob at the head end. Use with caution. The "Advanced" button offers "General," "Block," and "Mosquito" NR with the same 200-point resolution. Use with extra caution. User memories, source selection, aspect ratio, and overscan can also be accessed and adjusted from this main tab.

The next tab, "Advanced," gives the calibrators what they want. You can select color space (gamut), color temperature, gamma, two flavors of contrast fiddling: "Constant Contrast," which engages the dynamic iris, and "Adaptive Contrast," which evokes a filter in the image processor that trades clipping for measured contrast ratio. Experiment with those if you like but know that an experienced calibrator will turn both off. There is a control under this tab labeled "SatCo" (for color saturation, I assume), which will boost the brightness of Yellow, Cyan, and Magenta (and white) at the expense of color accuracy. Again, "off" would be my pick. Used with anything but the smallest screen, I would run the lamp on the LS-5 at "standard" or full bright, giving you ample brightness. Leave the luminance of the secondaries alone. You might like it when first employed, but it ain't the director's intent. Finally, there is the "RGB adjust" button, which will bring up the classic six white balance adjustments. Don't try this at home—(without a color analyzer). These are how we achieve that magic 6,500 Kelvin temperature at all luminance levels.

The third tab, "System," is really about housekeeping tasks like where onscreen the menu appears, its opacity, lamp power, blank screen color, logo display or not, etc.

The fourth tab, "Control," allows you to assign picture memories to the hard buttons on the remote. Picture settings, including ISF day/night, can be assigned to three discrete "user memory" buttons, and any of the eight inputs can be mated to one of five discrete "source" buttons. You can also specify which actions enable each of two triggers.

The fifth tab, "Languages," selects precisely that. You can view the entire menu in any of 12 languages.

Finally, the sixth tab, "Service," is much like an "Info" button. It displays the serial number and software version of your projector. It also shows the format of the incoming signal and the selected refresh rate. There are also two functions found here that should have been back in the "Advanced" section in my opinion; a "Blue only" mode, which is used to adjust the color decoder with analog video and an on/off mode switch that initiates about a dozen (very useful) internal test patterns.

Test Environment

CalMAN software from SpectraCal (see my column, this issue) was used exclusively in this review. It controlled a Sencore 403 video generator and a Konica-Minolta CS-200 chroma meter (spectrometer). A Minolta LS-100 was used to measure light output for the determination of absolute (real) contrast ratio. Various BD and DVD discs were used for reference-viewing impressions. The lamp on the LS-5 remained in the "standard" position throughout the testing and viewing. Images and patterns were displayed on a 108-inch wide Da-Lite .85 gain screen. Since brightness and contrast ratio vary inversely as a function of the zoom setting, it should be noted that in my test environment the standard lens provided was set to its shortest throw distance. All signals were input through the HDMI1 connection.

Single-Chip, 16:9 SuperOnyx™ DMD™ Full HD, 1920 x 1080

Video Inputs – HDMI 1.3 with HDCP (2), Component (1), S-Video (1), Composite (1), RGB HD15 (1), RS-232 (1)

Video Resolutions - 480i, 480p, 576i, 576p, 720p, 1080i 50/60, 1080p, 24/50/60, 1080PSF

Features

Aspect Ratio - Native (Pixel-to-Pixel), 16:9, Letterbox, 4:3, 4:3 narrow, Letterbox
Recommended 16:9 Screen Width: 72 - 96 in; Max Screen Width: 120in

Throw Distance - 1.85-2.40 (distance/width) - Standard lens
Factor x Screen Width - 1.56-1.86 (distance/width) - Optional short throw lens

Horizontal and Vertical Offset - -50% to +120% (vertical, ceiling mounted, % of the half height)

Light Output - CSMS** Specifications: Home Theater Calibration: 754 ANSI Lumens; 48

Foot-Lamberts (fL); 1000 ANSI Lumens*

Contrast Ratio - CSMS** Contrast Ratio: 481:1; 15,000:1 typical (sequential)*

Lamp - 180W (230W High Power Mode) (selectable)

Lamp Life - 4000 hour lifetime*

ISFocce™ calibration for individual sharpness and noise reduction controls

Specifications

Power Requirements - 100V - 240V at 50-60Hz (auto-ranging), true soft power

Operating - 50° F (10° C) - 104° F (40° C)

Dimensions (WxDxH) - 17.7 x 20.6 x 7.6 (inch)

Weight - 22 lbs

MSRP - \$6,995.00

Designed By:

Runco International

1194 NW Compton Drive

Beaverton, OR

97006

Performance And Calibration Gray Scale

When a color temperature of 6500K is selected, the LS-5 is very close out of the box. Still, with proper equipment and technique, it can be coaxed to near perfection. Not all DLP machines are so polite. It is a tribute to the design team that with only a two-point adjustment (color balance can only be adjusted at one place for high luminance and one other for low luminance—some new displays can be adjusted at 11 places from absolute black to peak white) the gray scale was able to be adjusted ruler-flat throughout the spectrum. In some sets, 11-point color balance adjustment is REQUIRED to mask "lumpy" gamma. Kudos, Runco.

Contrast Ratio

Here we go again. Everyone's looking for Mr. Big Number here. So this is where my contrarian side jumps up. I have long been overwhelmed by the contrast ratio measurement known as full-on, full-off (a.k.a., full-field). Indeed, it IS a measure of a device's ability to project light (or not) at the extremes, and all manner of stops are pulled out to achieve the biggest number possible. My argument is that it has little to do with anything you will see at any instant in time on your screen. As Joel Silver often cautions in ISF class, "Some cinematographers actually have the audacity to place a white object next to a black one in the same frame." Yep, they do. Still, for the record, I did measure a full-field contrast ratio at about 12,400:1 in my less-than-optimum environment for this kind of metric. Those who are enamored with five or six digit numbers should be reminded that the ratio is heavily influenced by the denominator, absolute black, which is often a "1" out in the fourth decimal place—which is a fraction of the best measurement instruments' accuracy spec!

I much prefer the checkerboard method (a.k.a., modified ANSI), which takes into account such detractors as lens scatter, screen anomalies, and room reflections—in other words, it is much like what you would experience watching an actual movie in your theatre. It is an excellent way to compare two projectors (or any displays) in the same test environment.

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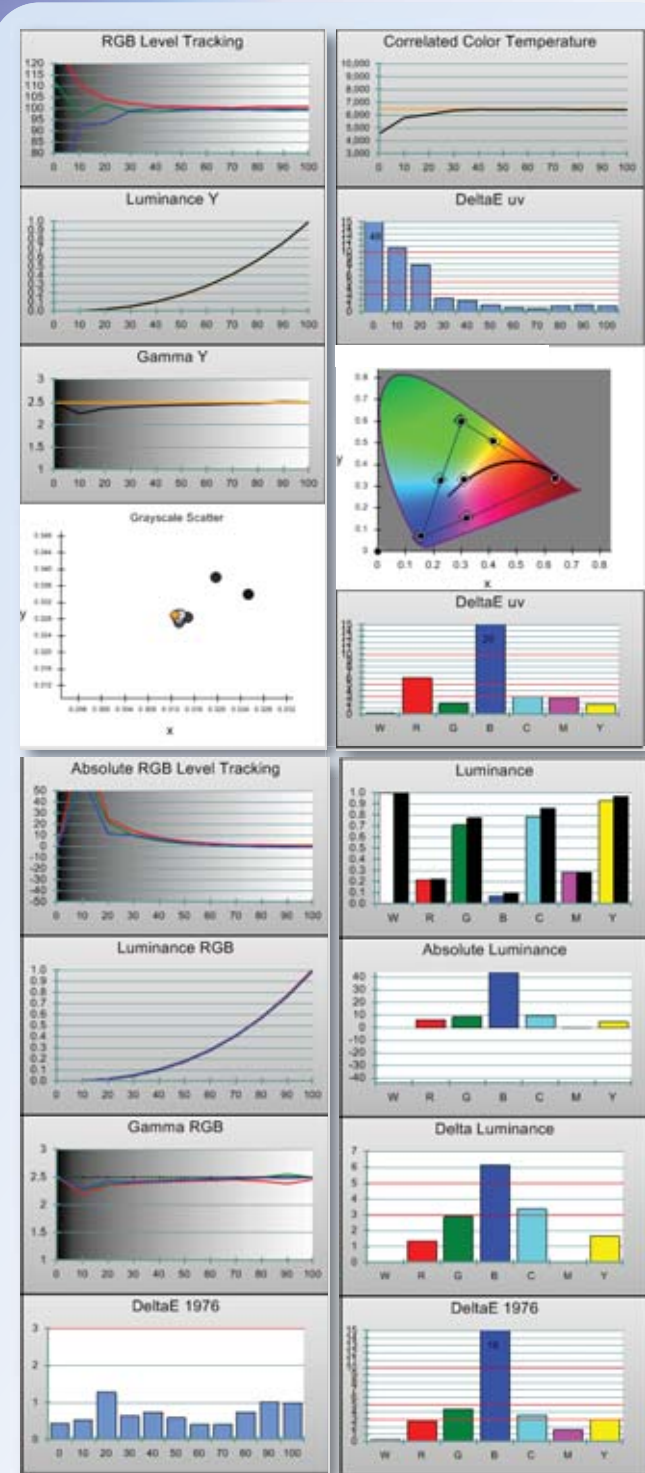
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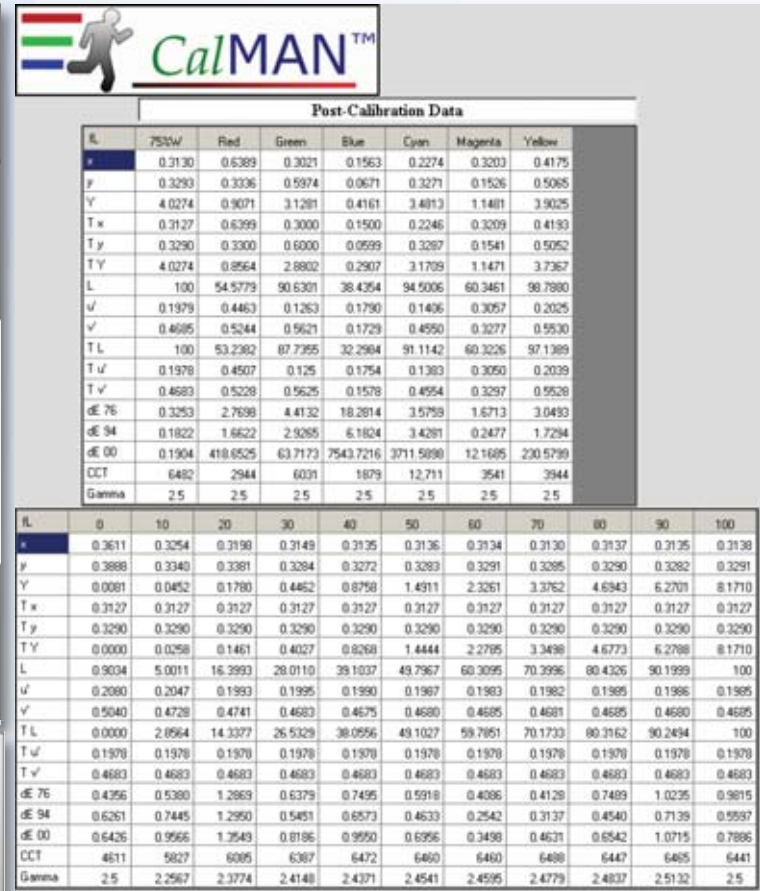
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This form of contrast ratio measurement yielded 288:1 which, believe it or not, is a very good for ANY projector at ANY price point. If I had opted for a smaller image size and used the "eco" lamp setting, I probably could have got an even larger number, but then if I had been born of different parents, I could have been the King of England!

Gamma

Gamma selections can be stepped through on the remote or selected from the "Advanced" menu tab. There are five choices,



although you are likely to only be concerned with 2.0, 2.2, or 2.5. After calibrating the gray scale, I measured actual gamma to be 2.4 on the projector's 2.5 setting and 2.1 on the 2.2 setting. Since I was testing in my pitch-black theatre (yes, I wore a black T-shirt and draped blackout material over the equipment rack), I was looking for 2.5. Having to live with a real 2.4 was no big deal and if I couldn't stand it, the CalMAN s/w would have allowed me to quickly craft a 2.5 gamma. As I have said before, I would normally front-end most any display device with an outboard video processor now that they are affordable and do so much, but with the LS-5, they would be a bit harder to justify. Runco has always had an edge up on the competition with its VIVix image processing and it's present here in the onboard incarnation. Truth is, additional outboard video processing is unnecessary for all but the pickiest videophiles.

Color Accuracy

To measure color accuracy, you first have to measure gamut. Are the primary and secondary color points where they are supposed to be, relative to some standard? The LS-5 offers you the choice of four selections, plus "auto," which will read a flag in the incoming signal and select the proper color space. The four that can be forced are Rec.709, the standard for HDTV and BD, SMPTE-C (SD), EBU, a European standard, and Native, the largest color space available by design. The measured primary and secondary color points relative to Rec.709 were scary close to perfect in both saturation and luminance. In fact, I would say the deltas were in the range of measurement error. As mentioned earlier, I usually employ outboard video processors in all my installations for two reasons. First to have a multi-point gray scale adjustment so I can "tame" any technology (LCDs are particularly

problematic), but more recently as a defense against the wildly over-saturated color gamuts many manufacturers default to out-of-the-box. "We give you 130 percent more colors." Well, we don't want that extra 30 percent, thank you, because they won't match anything the cinematographer had in mind. Kudos again to Runco engineers for showing some restraint and not making us drag colors all over the CIE chart in order to give the client a quality image.

Finally, some projectors get "tricked" into going to the wrong color space when fed an upconverted SD image from a standard DVD. In the "Auto" color space, the LS-5 does not make that mistake.

Motion Artifacts

While there are several flavors of motion artifacts, clearly, the most pesky are edge adaptive and sequence adaptive de-interlacing artifacts. I use lots of different patterns from a variety of test discs when calibrating, but some of the best "tortures" for evaluating motion artifacts can be found on the *Spears & Munsil* disc. Many of these patterns appear on the ABT (Anchor Bay Technologies) test disc as well, albeit in SD. I threw all that Stacy Spears and Don Munsil had at the LS-5 and with the exception of a few odd pull-down cadences, if the LS-5 stumbled, I didn't see it. All the classic montages are present on this disc (race car, ropes, ships, and rotating "clock" sequences) and they all ran as well as I have seen them, anywhere. Cadence identification and correction is very fast. The LS-5 did struggle just a bit with a few upconverted clips from a DVD player (native 480p). 24p film material was silky smooth. The ABT disc has a series of clips labeled "Bad Edits," which I always run. The Runco handled them as well as I have seen, which is to say a minor choke here and there, but overall, did an excellent job.

Lens Quality And Convergence

35mm cameras vary significantly in terms of price. If you chase down the main reason for this, you will likely find it has everything to do with the optics (lens). Quality lenses are expensive and are often underrated as a decision determinate when considering two, otherwise similar front projectors. When I saw the retail price of this product, and forgetting for a minute that it bore the "R" logo, I had a suspicion that someone may have scrimped on the optics—a popular way to reduce cost-of-goods-sold. A sure telltale of a "bargain" optic is something called chromatic aberration around the outer edge of the lens. All that's needed to observe this is a good, single-pixel grid pattern (like the one built into this projector). More often than not, you will see red, green, or blue peeking out from the white grid lines at the extreme edges of the grid. On the old CRTs, we would immediately call this malady "misconvergence." On today's fixed-pixel devices it is either caused by misaligned panel in the light engine or, more likely, an imperfect lens grind causing the aforementioned chromatic aberration. (Okay, there is more to Chromatic Aberration than just the grind, but cheap lenses have more of it than expensive ones.) Such trouble was absent in the LS-5, at least in my review sample. Moral of this side trip: Don't winch at paying a little extra for a quality lens. Double ditto when considering a secondary, anamorphic lens for 2.35 viewing.

Viewing Impressions

I had the luxury of having this review sample for several weeks. Regular readers know that I host a weekly event we unimaginatively call "Movie Thursday" with several of my hot rod buddies. We watch the best of whatever was released the previous Tuesday. Read "best" as most explosions/minute. And so after removing laptop, tripods, sig. gens, and analyzers, we settled in for the first of three or four weeks with the LS-5. My guys aren't videophiles, but they are used to my resident Vidikron 100 3-chip DLP. It's an excellent projector, but predates 1080 resolution. The first movie we watched was *The Hurt Locker* on Blu-ray Disc™ (BD), which is a very good (video) transfer with an excellent DTS® uncompressed sound track. Right from the first scene you

could almost feel the dirt from the Baghdad city road. We all noticed the improved depth of the overall picture (better contrast ratio) and some commented on the sharpness of the image (1080 trumps 720). I could immediately see the brightness improvement. Although initially I thought it was simply an apparent brightness improvement from higher resolution, after many hours of critical viewing I now attribute it to the lamp and the whole light engine. While looking good on my "XXL" screen, this projector would really pop on a more typical 72-inch wide, 1.3 gain, or even a matte version.

Over the weeks we watched *Shutter Island*, *The Unthinkable*, *The Book Of Eli*, and the dark *Wolfman*. All confirmed our initial impressions of superior sharpness, brightness, and overall improved contrast ratio. In the opening scene of *Wolfman*, the wolf's first victim walks through a forest at night. The 2.5 gamma of the LS-5 rendered ample detail amongst the subtle blacks and shadow detail in the trees. A reference piece that has been constant in my final viewings since it came out is *Baraka*. Carefully mastered and scene selected to be pure eye candy, almost any segment offers fully saturated colors, and most have inky blacks somewhere in the frame. I have not seen this disc look better, even on much pricier systems I have calibrated.

I also found time to review old favorite concert videos; M.J.'s *This Is It*, Tony Bennett's *An American Classic*, Elton John's *Elton 60*, *Chris Botti Live*, and Roy Orbison's *Black And White Night*. Yes, the improved contrast ratio is even more noticeable in monochrome. While it is true that concert videos don't really make good reference discs (stage lighting is artificial and constantly changing, making color accuracy an elusive parameter), still, having watched the aforementioned clips dozens of times, I detected a punchier overall image quality. I also noted, even with the addition of a color wheel, the LS-5 was quieter than the several-year-old three-chip Vidikron.

Conclusion

Runco has hit it out of the park with this product. One could even worry that they may have cannibalized some high-end business with the extraordinary value proposition offered here. To those who thought the rarified air of high-quality front projection was filled with only products made from unaffordium, think again. To get visibly higher image quality than offered by the LS-5, be prepared to spend four to five times its retail price. Spot-on colorimetry, ruler flat gray scale, high-quality optics, and every "tweak" necessary for an ultimate calibration, and all for less than what we paid for a decent flat panel last year, yields a new high water mark for both performance and value ... it does seem like a non-sequitur, doesn't it! **WSR**

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