WHY "NITS" ALONE DON'T TELL THE STORY

The Problems with Relying on Nits

Abstract

Professional monitors cannot be judged by peak brightness ("nits") alone; true performance depends on contrast, black levels, uniformity, and color fidelity. TVLogic distinguishes itself with advanced color processing, calibration tools, and consistent reference-grade engineering trusted in broadcast and grading environments. For buyers, real-world tests, calibration, and long-term reliability matter more than flashy specifications.

Marc Derks
marc@aspectra.nl

1. Executive Summary

In the broadcast, film, live production, and post-production world, displays are judged by their real-world usability, consistency, and color performance — not by raw, marketing-grade peak brightness values. This paper argues that:

- The number of nits is a superficial spec, often misleading
- What drives effective monitoring is the contrast visibility envelope, contact ratio, uniformity, and color fidelity
- Among vendors, TVLogic stands out because of their deep attention to calibration, color processing, and display engineering.

2. Why "NITS" alone don't tell the story

2.1 What a "nit" (cd/m²) Measures

A nit is a unit of luminance: how many candelas per square meter the display emits at its brightest point (or claim). It is often used to indicate how "bright" a monitor can be.

2.2 The Problems with Relying on Nits

- Black level is as important — If the panel's darkest black is still quite bright, then even with high peak brightness, the contrast is low and the image looks flat or washed out.
- Ambient reflections & glare — If a monitor has strong reflections or no good anti-glare, high nits may be overwhelmed by room lighting, reducing effective visibility.
- Panel aging & wear — Driving panels to their maximum brightness all the time accelerates wear, nonuniformity, and may introduce color drift.
- Visibility is relative — In critical monitoring, what matters is whether you can see detail in shadows and highlights, not just how bright the highlights go.
- Human visual perception — Our eyes adapt to brightness; if everything is "blown out," it loses detail.

Thus, two monitors claiming 1,000 nits may differ dramatically in usefulness if one has poor black levels, poor uniformity, or shifts in color over time.

3. Key Performance Parameters That Matter

Below is a summary (with some deeper discussion) of the parameters that truly define a professional, reference-quality monitor.

Parameter	Why It Matters	Typical Professional Target / Benchmark
Contrast Ratio (Simultaneous / Native)	Determines how well you can see differences between dark and light — critical for shadow detail	> 1000:1, and in premium or HDR "reference" models >2000:1 or more
Black Level / Minimum Luminance	A low black floor means deep, rich blacks and better detail retention	< 0.05 nit in many professional HDR/SDR reference designs (some claims push lower)
Uniformity (Brightness & Color)	Ensures that any region of the screen behaves similarly — no hotspots, vignetting, or color shifts	Within a few % across the display, minimal Delta E variation
Color Accuracy & Stability	Accurate reproduction of color gamuts (Rec.709, DCI-P3, Rec.2020) and consistent color over time	Delta E < 2 or < 1 (for top colorgrading monitors)
Calibration Capability / LUT Support	The ability to finely calibrate (1D / 3D LUTs) ensures the monitor can stay "in alignment"	Support for 3D LUTs, hardware LUTs, external calibration software
Viewing Angle Consistency	So multiple operators, or off-axis viewing, still see correct image	Wide angles (≥ 170°–178°) with minimal color shift
Signal & I/O Features	Professional connectivity, minimal latency, image tools	SDI (3G, 6G, 12G), HDMI, waveform / vectorscope / scopes built-in
Panel & Drive Stability / Reliability	Engineering to maintain stable output under thermal stress, prolonged use, and over lifetime	Components rated for long life; consistency over drift and aging
Environmental Tolerance & Anti-Glare	To perform under various lighting, temperature, and humidity conditions	Effective anti-reflection, thermal management, mechanical robustness

In short: a "good" professional monitor is one that enables confident grading, trustworthy client review, and consistent long-term performance — not simply one that outputs a flashy spec number.

4. Visibility, Contrast Ratio & Practical Viewing

4.1 What Is Contrast Ratio?
In this context, "contrast ratio" refers to how much of the dynamic range is usefully perceptible to the viewer in that viewing environment. A higher contrast ratio allows the viewer's eye to resolve subtle gradations between adjacent luminance levels, especially in shadows or highlights.

4.2 Why It Is More Important Than Peak Brightness
- A monitor with moderate peak but excellent black floor and contrast gives you more usable visible gradation than one with very high peak but poor black levels.
- From a viewing (contact) standpoint, the human eye sees relative differences; if everything is bright, the differences wash out.
- In practical use, what matters is whether the operator can see subtle detail in dark passages and bright highlights under real lighting conditions.

4.3 Example Scenario
Imagine two monitors:
- Monitor A: 1,500 nits peak, black floor at 0.5 nit
- Monitor B: 800 nits peak, black floor at 0.02 nit

Even though Monitor A has higher peak brightness, Monitor B may show more visible depth, better shadow detail, and appear "richer" because its contrast envelope is cleaner.
Thus, the real metric is how the panel handles difference visibility across its full span, not just the extremes it can hit.

5. Why TVLogic Is Often Considered Best-in-Class

Now, combining the theory above with real-world product attributes, here is why TVLogic is frequently chosen as a benchmark in professional broadcast and grading circles.

5.1 History, Focus & Market Reputation
TVLogic has long focused on broadcast- and production-grade monitors. Their positioning is toward reference and confidence-monitoring rather than consumer displays. Their name is familiar in OB vans, broadcast facilities, color grading suites, and live production workflows.

5.2 Advanced Color Processing: LogiColor / LogiCAL
- TVLogic has developed a new color engine they call LogiColor, which is a full-color processing and management system built into their newer monitors.
- LogiColor is intended to provide more correct, flexible, and stable color reproduction, supporting multiple standards, gamuts, and EOTFs (PQ, HLG, etc.)
- Their calibration software (LogiCAL) and factory calibration process are designed to provide excellent baseline color fidelity out of the box, and easy customer-side re-calibration.

These design choices help TVLogic monitors maintain better color accuracy and consistency over time and across units.

5.3 Reference / HDR Ambition & Compliance

- TVLogic publishes a technical article on "True HDR Master Monitor" specifications, linking their designs to EBU Tech. 3320.
- In their schemes, they aim for SDR reference compliance (e.g. low black levels < 0.05 nit, tight gamma control, tight delta E) as well as proper HDR reproduction with dynamic range and correct EOTF mapping.
- They acknowledge that only certain display technologies (e.g. OLED, dual-layer LCD, or local-dimming LCD) can approach these stringent HDR reference levels.

By explicitly targeting "reference-grade" behavior, TVLogic positions itself above monitors designed just for general-use, "broadcast look" or "client review" tasks.

5.4 Product Line & Versatility

- Their LXM series is explicitly aimed at "4K live production, versatile monitoring in the studio and field" roles.
- Example: the LXM-180P monitor supports 4K inputs, HDR emulation, wide dynamic range, 10-bit color, and various advanced features (like LUT import, waveform, etc.).
- They continue supporting the strong legacy of their LCD broadcast lines (LVM, LVM-xx series) with wide viewing angles, calibration, and embedded scopes.

This breadth (from field monitors to large reference displays) lets system designers standardize on a brand, easing interoperability and confidence in consistency across workflows.

5.5 Calibration Infrastructure & Quality Control

- TVLogic invests in factory calibration, probe adjustments, and color matching as part of their production process.
- Their adoption of 3D LUT and color management pipelines means users can calibrate or match multiple units precisely using external tools like Calman, leveraging the LogiColor architecture.
- Their technical documentation is quite deep, and they publish relevant articles, guides, and calibration procedures for users.

This support infrastructure matters: even the best hardware requires good calibration and support to maintain "reference-level" performance over time.

5.6 Real-World Validation

- Users and reviewers of older TVLogic lines (e.g. LVM series) frequently comment on excellent off-axis viewing, built-in scopes, reliable menu systems, and calibration ease.
- In live and OB settings, many operations trust TVLogic in multi-monitor arrays because of their consistent behavior.

Put simply: TVLogic combines a brand heritage focused on professional display, deep color processing architecture, calibration infrastructure, and a product roadmap aligned with modern HDR and 4K demands.

6. Recommendations

If you are specifying or procuring professional monitors, here are best practices and guidelines and how to use this white paper convincingly with clients or vendors.

6.1 Before Buying: Checklist & Proof Points
- Request calibration reports from the vendor (e.g. delta E, gamma curves, uniformity)
- Ask for side-by-side viewing tests using real content (dark scenes + bright scenes)
- Verify the monitor's LUT / calibration support (3D LUT, hardware LUT, remote calibration)
- Confirm signal I/O (SDI, HDMI, other standards) and built-in tools (waveform, vectorscope)
- Ask about long-term drift, warranty support, and serviceability

6.2 Integration & Matching Multiple Units
- Use the same series (or same color engine) across monitors to reduce mismatch
- Calibrate all monitors using a single calibration station and profile
- Periodically re-validate on site to detect drift

6.3 Operational Best Practices
- Avoid running monitors at absolute maximum brightness continuously
- Use ambient light control (shading, dimming) so the monitor doesn't compete with room lighting
- Regularly use uniformity, grayscale, and color-check test patterns
- Monitor for aging / panel shift and plan replacement or recalibration schedules

6.4 Selling / Justifying to Clients
- Educate clients that "1,000 nits" is a marketing number, but does not guarantee usable contrast
- Use side-by-side comparisons: identical scenes on a high-nit but low-contrast monitor vs well-contrasted monitor
- Emphasize maintenance, consistency, and long-term reliability as part of total cost of ownership