



Texas Instruments Picture Reliability



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Picture Reliability Study

- ◆ Anecdotal evidence suggested LCD picture quality degrades over time
- ◆ No empirical evidence of this: conducted side-by-side test of LCD vs. DLP™ technology
- ◆ 5 LCD projectors and 2 DLP™ technology-enabled projectors tested
- ◆ Experiment duration ~4000 hours: picture reliability attributes compared
- ◆ Conclusion: test results strongly supported anecdotal evidence

Picture Reliability Tests

- ◆ Conducted by Munsell Color Science Laboratory (MCSL) at Rochester Institute of Technology
- ◆ Began in May 2002
- ◆ The goal was to evaluate picture reliability of DLP™ technology vs. LCD technology over time
- ◆ Sample of five LCD and two projectors enabled by DLP™ technology
- ◆ Measurement included:
 - ❖ Luminance/brightness
 - ❖ Full On/Full Off (FOFO) contrast
 - ❖ ANSI contrast
 - ❖ FOFO and ANSI contrast for red, green, and blue colors
 - ❖ Color chromaticity for white, red, green, and blue

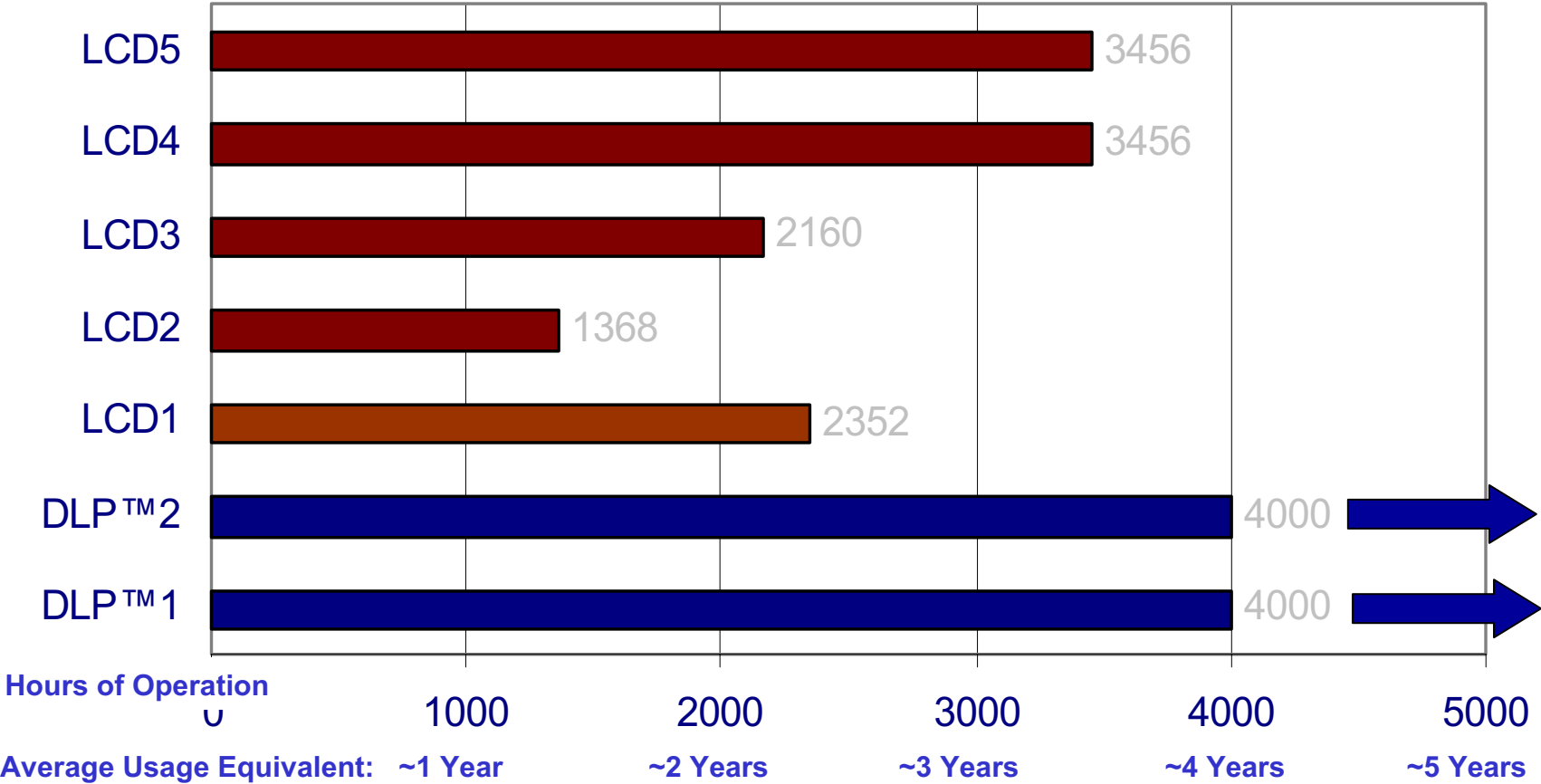


Picture Reliability Experiment

Results at 4000 hours

	LCD 5 units	DLP™ 2 units
Contrast	Falling (5 of 5)	Steady
Uniformity	Steady	Steady
Brightness	Steady	Steady
Colorimetry	Failure - color shift (5 of 5)	Consistent
Visible Picture Defect	Failure - visible defect (5 of 5)	Consistent picture

Time to Failure



Failure = visible picture defect

Experiment Results 3312 Hours

LCD 1



Photo at 24 hours



DLP™ 1



LCD 2



LCD 3



DLP™ 2



LCD 4



LCD 5



Progressive Degradation

LCD 2



24 hours

1440 hours

2256 hours

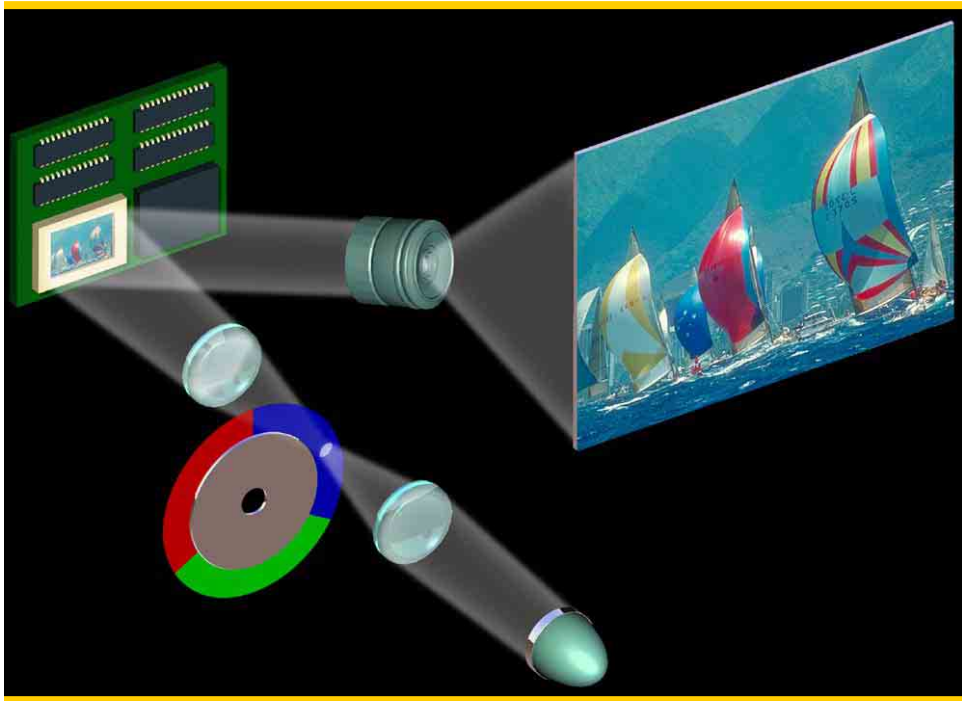
3312 hours

DIGITAL LIGHT PROCESSING™. YOU'VE GOT TO SEE IT.

 TEXAS INSTRUMENTS

DLP™ Picture Reliability

DLP™ technology is *immune* to degradation, guaranteeing optimum picture reliability.



- ◆ DLP™ system components are robust to long term light exposure
- ◆ Reflective technology minimizes light absorption
- ◆ All-digital – unaffected by aging
- ◆ 100,000 hours lifetime
- ◆ Reliable semiconductor process

Test Conclusions

- ◆ Marked difference in picture reliability over time between LCD- and DLP™ technology-enabled projectors
- ◆ DLP™ technology demonstrated picture reliability over the test period
- ◆ Image quality defects caused by optical degradation were highly visible for LCD
- ◆ Downward trends in optical performance for LCD on most of the parametric data
- ◆ Image degradation for LCD was permanent: not recoverable by lamp replacement

Conclusion

As projector use steadily increases in an expanding sphere of applications, picture reliability is becoming a key customer concern.

1. Picture reliability should be expected for the lifetime of a projector.
2. DLP™ technology is *immune* to degradation, guaranteeing optimum picture reliability.
3. DLP™ technology's picture reliability results in lower total cost of ownership.