

DVD Compatibility Committee

Phase 1 findings

What is good compatibility?

- **Goal: DVDs recorded on one device, will play back flawlessly on other devices**
- **Definition: a recordable DVD is “compatible” if its playback is equivalent to the playback of a pressed disc with identical content**
- **Not testing specifications!**



What is the “DVD Compatibility Committee?”

- **A joint effort by 3 organizations:**
 - **OSTA (Optical Storage Technology Association)**
 - **NIST (Natl. Inst. of Standards & Technology – US Chamber of Commerce)**
 - **DVDA (DVD Association)**
 - **Focused on identifying, testing, and fixing issues related to DVD Compatibility**
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Committee Goals

- **We do not provide specific brand or manufacturer recommendations**
 - **We are not aligned with any DVD format**
 - **We provide objective source of general DVD compatibility information**
 - **We perform compatibility testing from a consumer point of view**
 - **Identify causes of compatibility problems**
 - **We collaborate with manufacturers to improve their product compatibility**
 - **Provide detailed results back to companies**
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Committee Members

- **Subutai Ahmad (YesVideo, Committee Chair)**
- **Oliver Slattery, Fred Byers (NIST)**
- **Bob Zollo & Lee Prewitt (Software Architects)**
- **Jim Taylor (Sonic Solutions, President DVDA)**
- **Victor McCrary (Johns Hopkins Applied Physics Lab)**
- **Dave Bunzel (Santa Clara Consulting, President OSTA)**

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- **Active input from OSTA member manufacturers**
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Phase 1 tests

- **Created objective test plan for testing DVD-ROM drives, published by NIST**
 - **Assessed current market state of DVD-ROM compatibility**
 - **Tested 14 ROM drives representing ~60% installed base**
 - **Tested 50 discs, varying brands and formats**
 - **Only one burner per format for Phase 1**
 - **Identified correlations between physical measurements and compatibility**
 - **Fed detailed data back to manufacturers**
 - **Tests completed: September 2003**
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Test Discs

- **DVD-Video disc with data files**
 - **Pressed discs for control**
 - **Discs > 97% full**
 - **Four sets of discs for each brand**
 - **> 50 sets in phase 1**
 - **Selection of brand for testing is based on market share and broad availability**
 - **Media types tested**
 - **DVD-R for Authoring (CE players only)**
 - **DVD-R for General**
 - **DVD-RW**
 - **DVD+R**
 - **DVD+RW**
 - **DVD+R “Compatibility mode”**
 - **DVD-RAM (ROM drives only)**
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NIST DVD-ROM Test Plan

Two drives required:

- **Reference drive**
Contains DVD-ROM title* of test disc
- **Test drive**
Contains the writable test disc

Compare pressed disc to recordable disc

Four basic parts to the test

- **Disc detection (spin-up)**
- **Byte to byte comparison**
 - Performs direct sector to sector comparison
 - Examines approximately 1% of the total data, spread throughout the disc
 - Pass only if 100% of the bytes compare correctly
- **Data rate drop**
- **Video and audio quality**

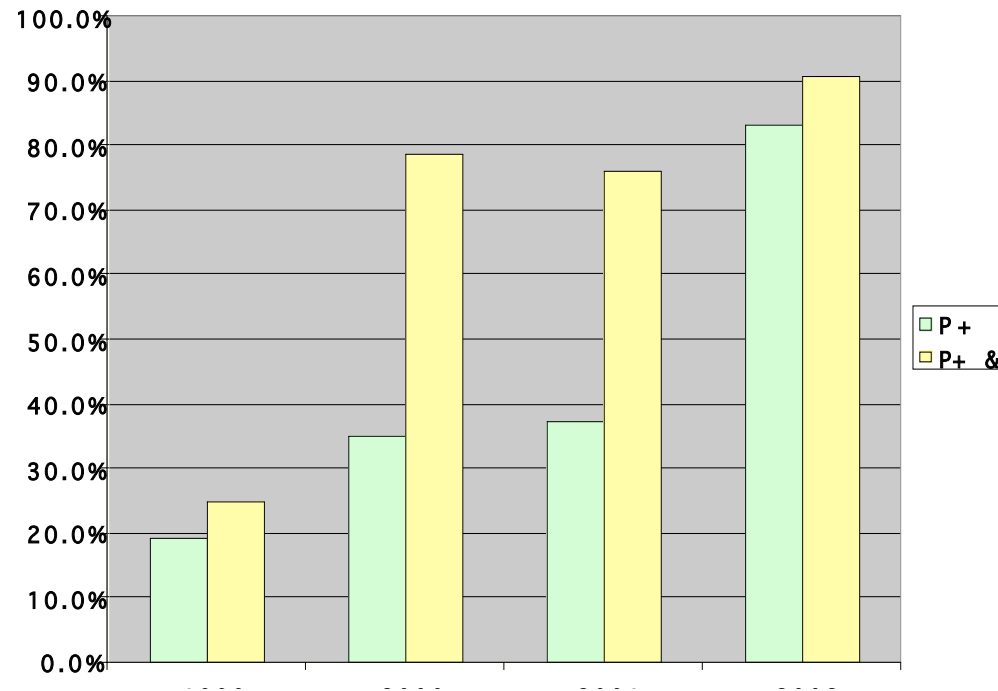
*('Saint Saens and Bizet' for DVD-R, DVD-RW, DVD+R, DVD+RW)

*('The Call' for DVD-RAM test discs)

Summary of results

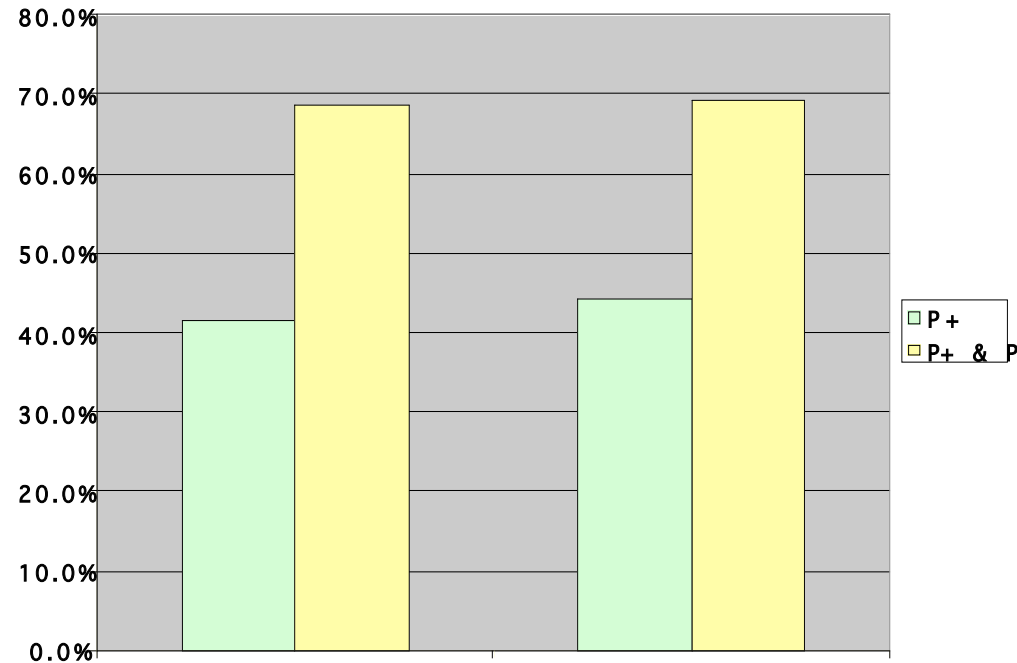
Compatibility not perfect but improved

- **Compatibility not 100% across the board**
- **Increasing compatibility with newer drives**
- **Drives manufactured in 2002 and later are much more compatible**



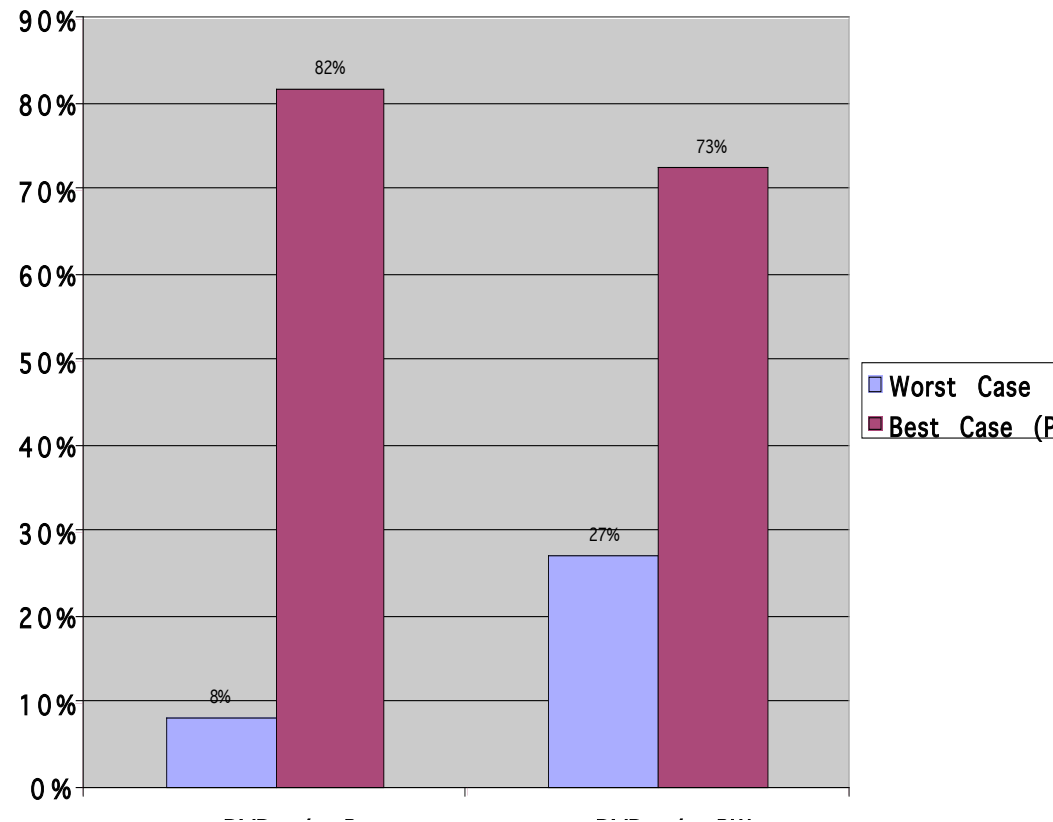
Format is not important for compatibility

- **No difference between -R/RW and +R/RW with respect to compatibility**
- **With ROM drives, no difference between R and RW formats**



Media Compatibility Variance is Huge

- Huge difference between media manufacturers and brands
- Worst media is intolerable

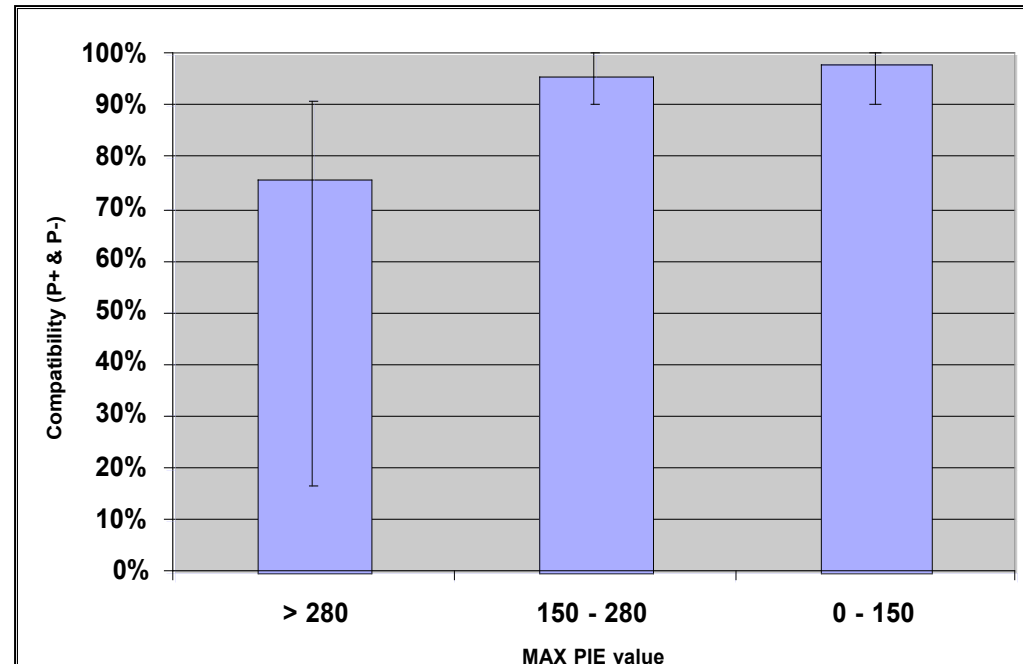


What determines good quality media?

- **NIST / Library of Congress performed controlled physical testing of test discs**
 - **Equipment used**
 - **DaTARIUS CS-4.2/DL**
 - **Measured –R and +R discs for:**
 - **Average & Max inner parity (PIE)**
 - **Average Jitter**
 - **PIE fail**
 - **etc.**
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Max PIE was best predictor

- **One particular measure had large effect on compatibility**
 - **Max Inner Parity Error**
 - **Measures ability to recover from disc errors**
- **Discs with Max PIE < 280 had compatibility around 95%**
- **Info fed back to mfrs**



Set-top DVD Player testing

**Testing and data courtesy of
Ralph LaBarge, Alpha DVD
Article in DV Magazine**

LaBarge DVD Player tests

- **Same test discs used**
 - **Over 30 models of consumer DVD players**
 - **All consumer DVD-Video players in the test matrix were designed to support at least one of the recordable DVD formats tested.**
 - **All consumer DVD-Video players tested were released during 1999-2003**
 - **Extensive testing in independent facilities**
 - **Results published in DV Magazine**
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- **Similar results with set top players:**
 - **Little difference between –R and +R.**
 - **Some differences between R and RW**
 - **DVD +/- R (4.7 GB) = 87%**
 - **DVD +/- RW (4.7 GB) = 82.7%**
 - **Large differences between media brands / manufacturers**
 - **DVD +/- R 4.7GB 67% - 100%**
 - **DVD +/- RW 73% - 87%**
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Phase 1 Test Summary

- **New drives performed significantly better**
 - Best drive (2002) had only one “Fail”
 - **Format (- vs +) not as important as the quality of media**
 - **There is significant deviation in scores**
 - between discs, even within the same format
 - **No significant difference between write once and rewritable for ROM drives**
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General tips for consumers

- **Use recent drives**
 - ROM drives manufactured before 2002 will have poor compatibility
 - **Use high quality media**
 - Typically major brand names will perform strict quality control
 - **Burn with verify mode “on”**
 - **Use media recommended by burner manufacturer**
 - DVD burners need to be optimized for different media brands
 - Most mfrs will list media that they have tested
 - Update burner firmware to latest version
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Phase 2 testing started

- **Testing burners and latest high speed media using Q2 03 sell through data**
 - **6 burners representing > 75% of drives selling in Q2 '03**
 - **Media represents 65-80% of media sold in Q2 '03**
 - **Will create discs with each burner at fastest burn speed possible**
 - **Same playback test plans**
 - **Results available Q2 '03**
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References

- **Phase 1 test plan distributed as a NIST special publication:**

www.itl.nist.gov/div895/pubs.html#DataPreservation

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Acknowledgements

- **Special thanks due to Ralph LaBarge who contributed his test discs, and much of his time and expertise**
 - **Siva Srinivasan and Alexei Nikolaev (NIST)**
 - **OSTA manufacturers for their feedback**
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