

# DVD Technology (Digital Versatile Disc) Workshop (2 days)

## Course Summary

Called Digital Versatile Disc because of its ability to be used across a number of applications areas - audio, video, computer, multimedia - DVD can truly be called a convergence medium because it meets the needs of both the consumer entertainment and computer industries. DVD represents a quantum leap forward in digital media. DVD will run at a much faster data rate, enabling stunning graphics, widescreen video, surround sound, interactivity, multiple language subtitles; the list goes on.

Physical and engineering principles used in the construction of DVD are introduced. This course will review fundamentals of optical recording techniques and present the state-of-the-art technology integrated in optical data storage including: read only, recordable - write once, and re-writable technologies. Participants will leave with a solid understanding of how this exciting technology functions - from the how the data is stored on the disc through how the DVD-ROM drive recovers data, from the various standard formats used in organizing the data to the computer interfaces, commands, and drivers used to access the data and control the drive. The class also covers the extension to the basic DVD-ROM technology: DVD-R, DVD-RAM, etc. It concludes with a discussion of the opportunities and obstacles, and future directions.

## Course Objectives

Provide background for understanding the DVD standards

Discuss: the basic principles of recording and playback and derives the fundamental performance limits of the system, i.e. storage density, capacity, error rate, etc.

Discuss technical aspects related to copy protection: encryption, watermarking, etc.

Discuss recording technologies for the write-once and rewritable discs , optical mastering and replication

Discuss the performance requirements imposed by low cost discs and design considerations imposed by economical drive

Discuss basic problems in the system integration, Opportunities.

## Who Should Attend

This course is designed for engineers, scientists, and technical management personnel involved in the design specification, implementation, management, or utilization of DVD systems, and others who wish to acquire knowledge of DVD systems. The course should also be of special interest to system integrators. Participants will be provided with the technical and conceptual background required to design and implement DVD systems. The content is practically oriented, focusing on implementation of the technology.

## Day 1

### Introduction

### Description of Course Structure and Content

### Course Objectives

### DVD System Overview

- What is an optical memory system
- Standards
- Comparison of Pre-recorded & User Recorded Discs
- Applications of Present Systems

### Technology Overview

- Technology Development Process
- Fundamental Limits
- Key Component Performance

- Testing and Evaluation

### **Enabling Technologies**

- V/A Compression
- MPEG-2
- AC-3
- Advances in Optical Recording

### **Channel Coding**

- Basic Codes
- EFMPlus: 8-to-16 Modulation

### **Copy Protection**

- Data Security: Cryptography
- Goals of DVD Copy Protection
- Watermarking
- Regional Coding
- Analog Protection Systems

## **Day 2**

### **Interpreting the DVD Specification**

- DVD Book Construction
- Data Flow
- General Specification and Parameters
- Disc Specification
- Information Area Format

### **Mastering and Replication**

- Basic Process
- Read Only Technology
- DVD-ROM
- Write One and Erasable Systems
- Pre-mastering Processing
- Bonding

### **Quality Control**

### **Playback System**

- Basic Reading Techniques
- Pickups for Read-Only, Write Once and Erasable Disks
- DVD As a Communication Channel
- Servo Systems

### **DVD Player vs. DVD Drive**

- MPEG-2 PC Technology Development Process

### **DVD Enhancements**

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