

Understanding Serial ATA

**Solution
Technology**



The “Understanding Serial ATA” course provides students with a comprehensive insight into the operation of the Serial ATA interface. The class examines the evolution of ATA, summarises the operation of the ATA interface and then explores in detail the operation of Serial ATA at all architectural levels. Serial ATA II Extensions are also thoroughly discussed. The class concludes with a study of new application areas in which Serial ATA will be deployed. Protocol analyser traces are used as an aid to understanding.

Introduction

History and evolution of ATA
Parallel ATA limitations
Moving to a serial interface
Serial ATA goals and objectives
Serial ATA benefits
Comparison of storage interfaces
New markets for ATA devices
ATA Standards and Architecture
ANSI and industry associations
Parallel ATA standards
Serial ATA standards
SATA architectural layering
Understanding terms and definitions
Sources of information
ATA Technical Overview
Parallel bus functions
The I/O register model
CHS and LBA addressing
PIO and DMA data transfer modes
Serial ATA Technical Overview
SATA architectural model
Physical layer concepts
Topology/connectivity
Power and signal lines
Link speeds/data rates
Basic SATA port model
Physical layer services

Serial ATA Technical Overview(cont.)

Link layer concepts
Transmission words
8b/10b encoding concepts
Primitives
Framing concepts
Scrambling
Transport layer concepts
Frame Information Structures (FIS)
FIS types
Error detection and recovery concepts
Example analyser trace
SATA II enhancement summary
(end of Day 1)
Physical Layer
Cables and connectors
Electrical signalling
Spread spectrum clocking
Interface power states
Link initialisation
Speed negotiation
Out of band signalling
Elasticity buffering
Link Layer
Link layer services
8b/10b encoding
Primitive signal definitions
Primitive signal protocols
Flow control
Primitive scrambling
CRC and FIS content scrambling
Link state diagrams
Example analyser trace

Transport Layer

Transport layer services
FIS construction and decomposition
FIS structure
FIS types
Host transport states
Device transport states
Example analyser trace
Device Command Layer Protocol
Power on behaviour
Device resets
Diagnostics
Non-data command protocol
PIO command protocol
DMA command protocol
Error Handling
Physical layer errors
Link Layer errors
Transport layer errors
Serial ATA II Extensions
SATA II objectives
Physical layer extensions
Transport layer extensions
Command layer extensions
Enclosure services and management
Serial ATA in the Enterprise
Future enhancements to Serial ATA

This in-depth technical class is targeted towards engineers involved in the design, development, integration, deployment and maintenance of Serial ATA storage devices and systems.

Day 1 of the class may be taken by those requiring a broad understanding of Serial ATA technology with less technical depth; this includes technical managers, IT managers and staff, technical writers, technical sales and marketing staff.

Prerequisites: Some familiarity with computing and storage concepts.

Course length: 2 days