

USB 3.0 Architecture Update Training Course Outline

Course Description:

In this USB 3.0 training course you will gain the most current knowledge of the third generation of USB - SuperSpeed USB. We will thoroughly examine the increased transfer rates to 5.0Gbps, improved flow control and power management, as well as the changes to the protocol layers. USB 2.0 is briefly reviewed because USB 3.0 is required to be completely backwards compatible.

Course Prerequisites:

Some understanding of the USB 2.0 specification.

Course Objectives:

As a result of taking this USB 3.0 training course, you will be able to:

- Explain the required backward compatibility with USB 2.0
- Discuss the details of the new bus architecture
- Define the new SuperSpeed data flow model
- Identify host and device requirements
- Analyze actual traffic on the bus, including the different transfer types
- Describe the new power management features
- Implement requirements at the physical, link, and protocol layers
- Knowledge of all the Super Speed USB updates as of January 2011

Course Outline:

Module 00: USB 3.0 Architecture Update Course Introduction

Module 01: USB 2.0 Overview Part 1

- Device, Hosts, and Hubs
- USB 2.0 Topology
 - Physical Layer
 - Link Layer
 - Protocol Layer
- USB Transfer Types

Module 02: USB 2.0 Overview Part 2

- Error Handling
- Communication Model-Transactions

Module 03: USB 2.0 Transfers

- Control Transfers

- Interrupt Transfers
- Bulk Transfers

Module 04: Packets and Descriptors

- Packets and Packet Type
- Descriptors

Module 05: USB 2.0 Configuration

- Power Management
- Device Detection-Signaling
- Differential Signaling

Module 06: USB 3.0 Architecture

- Support for USB 2.0
- USB 3.0 Architecture Overview
- System Description

Module 07: Data Flow Model

- USB 3.0 Transfers
 - Types
 - Data Bursting
- Transaction Protocol Improvements

Module 08: Physical Layer

- Transmitter/Receiver Requirements
- Data Scrambling
- Encoding
- LFPS
- Mechanical requirements

Module 09: Link Layer

- Packets
- Flow control and Link Management
- LTSSM
- State Diagrams
- Resets

Module 10: Protocol Packets Part 1

- Packet formats
 - Link Management Packets
 - Transaction Packets

Module 11: Protocol Packets Part 2

- Packets
- Device Notification
- Data Packets

- Format and Sequencing

Module 12: Transfers Part 1

- Transactions
- Data Bursting
- Bulk Streaming

Module 13: Transfers Part 2

- Interrupt Transfers
- Sequencing
- Isochronous Transfers

Module 14: Device States and Enumeration

- Device States
- Device Operation
- Enumeration

Module 15: Request and Descriptors

- Device Requests
- Device Descriptors
 - New to 3.0
 - Modified 2.0

Module 16: Hubs

- Hub Architecture
 - State Machine
 - Repeater/Forwarder
- Packet Routing
- Resume Signaling

Module 17: Power Management

- Link power management
- Device PM
- Hub PM
- Suspend/Resume
- Latency Tolerance Message

Module 18: UAS

- History of Bulk
- Goals for UAS
- Transfers

Module 19: Data Traffic Analysis

- Link Control
- IN and OUT transactions
- Packets

- Demo