



IM2 - Display Port 1.1a

This course covers the Display Port multimedia interface

Objectives

- The course describes the architecture of a DisplayPort source-cable-sink system.
- An introduction to Video and Audio standards is done prior to clarifying how this standards are transported through DisplayPort.
- The analog interface is studied in detail.
- The course clarifies information 8b10b coding / decoding schemes.
- Content protection mechanisms are also studied.

A more detailed course description is available on request at info@ac6-training.com

Prerequisites

- A basic knowledge of multimedia standards (audio & video).

Plan

First day

INTRODUCTION TO DISPLAYPORT

- Chip-to-Chip or box-to-box utilization
- Layered architecture
- Pinout
- Forward drive channel and bi-directional auxiliary channel
- Mechanical specification
- Dual mode devices

PHYSICAL LAYER

- Hot plug / Unplug detect circuitry
- Main channel
 - 8b10b coding scheme, running disparity
 - Clock recovery logic
 - Channel equalization sequence
 - Scrambling, whitening the spectrum, Scrambler reset
 - Link quality measurement
 - Transmitter and receiver electrical specifications

- Drive current and pre-emphasis level control
- Jitter requirements
- Auxiliary channel
 - Manchester II coding, self-clocking
 - Sync pattern, Stop condition
 - AC coupling
- Compliance test specification

LINK LAYER

- Isochronous transport services over the main link
 - Enhanced framing mode
 - Link symbols over the main Link without video stream
 - Adapting the stream rate to the link rate
 - Stream reconstruction in the Sink
 - Extracting the secondary data packet
 - Stream clock recovery, synchronous vs asynchronous clock modes
 - Secondary data packet types, purpose of InfoFrames packets
- Auxiliary channel
 - Link and device management over the auxiliary channel
 - Source state machine
 - Arbitration control
 - Policy maker
 - Mapping of I2C onto AUX CH syntax
 - Address mapping for DPCD
- Compliance test specification
 - Device services test procedures
 - Device Link services test procedures

Second day

VIDEO STREAMS

- Video standard basics, SDTV, EDTV, HDTV
- Pixel mapping onto link lanes according to pixel coding
- Video timing format
- Direct drive display specification
- Embedded Display Port

AUDIO STREAMS

- Audio basics, L-PCM coding, IEC standards
- Speakers mapping
- Scheduling of audio stream packet transmission
- Source / Sink device interoperability, audio format
- Structure of audio stream packets

CONTROL AND CONFIGURATION

- The Display Data Channel [DDC] usage during configuration
- AVI info frame
- Audio info frame
- E-EDID data structure
- Source device behavior upon HPD pulse detection

CONTENT PROTECTION

- HDCP specification (DRM)
 - Authentication of devices allowed to play HD content
 - Computation of shared key
 - HDCP over Display Port
 - Application to DVD-audio and super-audio CD
- DPCP specification
 - DPCP bulk encryption / decryption blocks
 - AUX CH transactions for DPCP

Renseignements pratiques

Duration : 2 days
Cost : 1250 € HT

