



Jump and swim

USB Peripheral Design

4 days

S cope

The USB protocol replaces older communication standards around the personal computer. Some modern computers, for example, do not offer legacy RS232 ports. The *Jump and Swim* USB peripheral design course, introduces the USB protocol, hardware engineer aspects as well as a software programmer point of view.

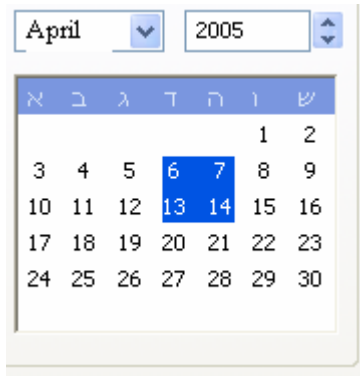
Jump and swim – Along the course, we present three design references that were developed by us, especially for the course. These references cover many different USB peripherals requirements.

Each design reference includes: demonstration hardware printed circuit board, electronic schematics, embedded source code and WindowsTM device driver source code. Our student may use and modify the designs to meets their needs, royalty free.

Sillabus

1. **Introduction** -USB vs. RS232, FireWire, Centronics, USB1.1 and USB2.0
2. **USB Terminology** – Topology, upstream, downstream, function, device, endpoint, hub, etc.
3. **The physical layer** - Cable and connector, Power distribution, Speed identification
4. **Signaling** - Differential signaling, Simple transceivers, Termination, Low Speed, Full Speed, High Speed, Suspend and resume, Reset
5. **Packets** – Tokens, SOF, IN, OUT, SETUP ,Data packets, Handshake packets, ACK, NAK, STALL
6. **Transaction** - Control, Interrupt, Bulk, Isochronous, Error detection and recovery
7. **Predefined device classes** - HID and Reports, Mass storage
8. **General Enumeration process** - Enumeration steps, Device descriptor, Configuration descriptor, Interface descriptor, String descriptor, Endpoint descriptor
9. **HID Enumeration process** – HID descriptor, Report descriptor
10. **USB processors** - examples
11. **Embedded firmware** – Enumeration, Runtime
12. **Design Reference 1** – HID Keyboard emulation by panel switches
13. **Host Device Driver** – Enumeration, Runtime, INF files, Registry
14. **Design Reference 2** – Simple I/O Device
15. **Design Reference 3** – Data Acquisition (A/D+D/A) Device

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Schedule

Next course will take place at Sheraton City Tower hotel, Ramat Gan. On Wednesday-Thursday, April, 6,7,13,14 , 2005 – between 09:00-16:50.

Audience

The course is intended toward engineering audience, project leaders, hardware and software engineers.

Lecturer

Dr. Ben-David holds B.Sc. (Summa Cum Laude), M.Sc. and Ph.D. degrees, all in Electrical Engineering from the Technion, Haifa Israel (1987,1990,1994 respectively). His main interests are in Digital Communication and Digital Signal Processing. He is the owner of an electronic design house. Gal holds a guest lecturer position at the Technion and instructs both graduate and undergraduate classes.

Registration

Registration fees are 4,000 NIS +VAT. Please use enclosed form. Price includes all course material including design references, morning coffee and lunch.

Misc.

Please contact us for in house training.
Stay tuned more Jump-n-Swim course will be presented shortly.