

## Cadence SpeedBridge Adapter for USB 2.0 Host

### High-speed in-circuit emulation for hardware/software co-verification

The Cadence® SpeedBridge® Adapter for USB 2.0 Host allows a USB 2.0 host controller emulated in a Cadence Palladium® system to interface with an at-speed USB 1.1/2.0 device. Designers can use it for hardware/software co-verification, early verification of embedded software (prior to hardware prototype), and IP reuse, boosting their productivity while reducing system risk.

#### Overview

As SoC designs continue to increase in size and complexity, verification becomes increasingly time-consuming. Acceleration and emulation enable more comprehensive validation of a design than with simulation alone, and they allow engineers to develop firmware, drivers, and software before final silicon availability.

The SpeedBridge Adapter for USB 2.0 Host targets SoC designs with embedded USB 2.0 host controllers. The emulated USB 2.0 host resides in the emulator and is connected to the SpeedBridge Adapter externally. At the emulation interface, the SpeedBridge Adapter acts as the PHY transceiver to the USB 2.0 Host. It allows real USB 2.0 devices such as USB flash drives, cameras, and printers to connect and communicate with the emulated USB 2.0 host controller.

The SpeedBridge Adapter manages the link states as well as buffering data transferred between the USB 2.0 host and devices.

A typical USB 2.0 exerciser/analyzer can be connected to the USB host design in the emulator via the SpeedBridge Adapter to analyze USB traffic or provide device emulation, timing analysis, and high-level protocol decoding. Alternatively, third-party software can be used to create custom test drivers to enable basic USB testing.

The emulation interface is the standard digital Universal Transceiver Macro Interface (UTMI) or UTMI Low Pin Interface (ULPI) that would normally connect to a USB transceiver. The SpeedBridge Adapter provides the necessary virtualization of the USB transceiver so that an emulated device will connect and configure in a normal manner as if a real transceiver were being used.

With the high speed of in-circuit emulation, engineers can co-verify hardware and software together with USB application software. Engineers have both hardware and software debug tools for ease of use, ease of debug, and high-speed, so they don't have to sacrifice quality. They can use USB monitor and debug tools for their operating systems to see low-level USB activities, performance testing, debug drivers, or application software. Cadence provides best-in-class hardware/software debug tools and methodologies.

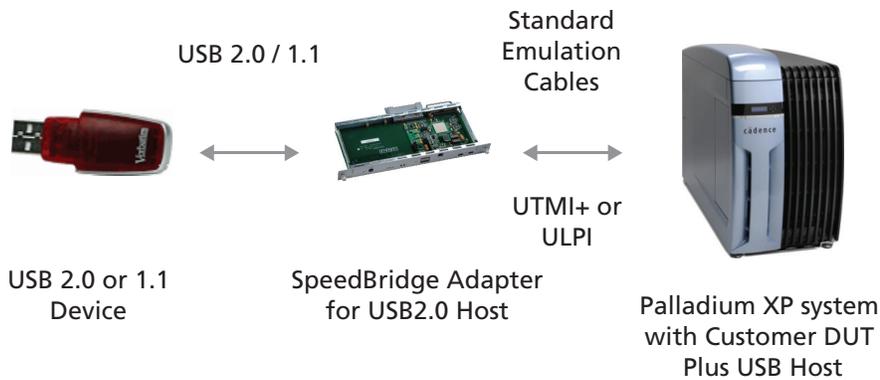


Figure 1: The SpeedBridge Adapter for USB 2.0 Host connects a Cadence emulation system to a USB device

## Features

The Cadence SpeedBridge Adapter for USB 2.0 Host supports the following:

- UTMI Levels 1 and 2 (HS, FS, and LS)
- ULPI 8-bit synchronous mode
- UTMI 8bit/16bit Uni/Bidir
- Control, bulk, and interrupt endpoints
- High-speed, full-speed, and low-speed transactions
- SpeedBridge Configuration Module for remote settings and debug

## Benefits

### Reduces system risk

- Enables USB 2.0 host verification in an SoC/system environment
  - Enables verification of software/drivers/interfaces (OS, drivers)
  - Enables collaboration among hardware/software engineers for efficient debugging with respective views
- Improves productivity
  - Offers a high-performance emulation solution for verifying USB 2.0 hosts
  - Enables concurrent verification of embedded software with hardware model of core as soon as RTL is available
  - Provides test IP so engineers can start from known working setup

- Enables IP reuse
  - Delivers a solution that works from one project to another
  - Eliminates the need for every user to re-invent the solution
  - Enables rapid emulation deployment
- Enables advanced debugging
  - Leverages the advanced debugging capabilities of the Palladium system such as FullVision
  - Provides on-board LCD and LED indicators

## Specifications

- USB 1.1 and 2.0
- Does not support split transactions or hubs

## Cadence Services and Support

- Cadence application engineers can answer your technical questions by telephone, email, or Internet—they can also provide technical assistance and custom training
- Cadence certified instructors teach more than 70 courses and bring their real-world experience into the classroom
- More than 25 Internet Learning Series (iLS) online courses allow you the flexibility of training at your own computer via the Internet
- Cadence Online Support gives you 24x7 online access to a knowledgebase of the latest solutions, technical documentation, software downloads, and more