

CAST

USBHS-OTG-SD-SS

USB Hi-Speed On-The-Go Single Device Software Stack

The USBHS-OTG-SD Software Stack is a USB 2.0 On-The-Go compliant software layer dedicated to support applications built upon a variety of different microprocessors. It provides a device and host Application Programming Interface (API), which allows the user to develop his own software without detailed knowledge of the USB hardware.

Applications

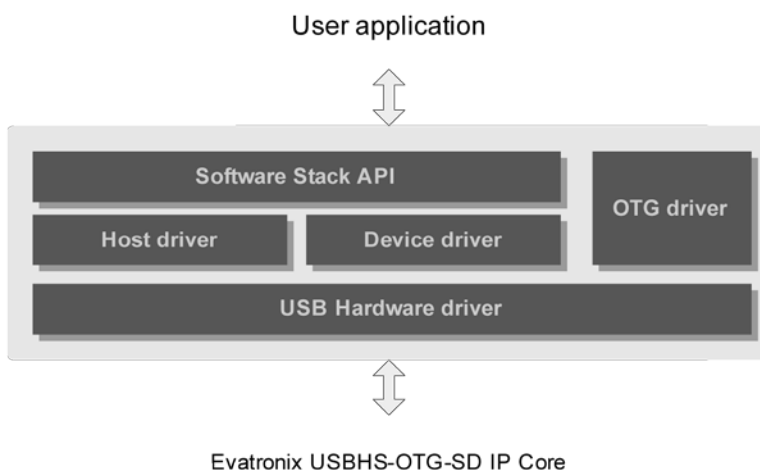
Enables the direct connection of digital products without a computer host, for example:

- Connecting a digital camera directly to a printer for prints or to a cellular phone for Internet photo sharing.
- Connecting a digital music player to a CD player to download songs, to a set of speakers to play them, and to a disk burner to archive custom playlists.

Benefits

- Supports USB Host, Peripheral and On-The-Go devices
- Layered structure guarantees easy portability to various system architectures and seamless integration with other USB controllers
- ANSI-C source code for high speed and small footprint
- Separate controller layer relieves the SoC developer from operations on registers, while automatic descriptor parsing eliminates manual initialization
- Variety of available class drivers

Block Diagram



Features

- Complies with USB 2.0 and USB 2.0 OTG specification
- Native support for all popular USB classes
- Support for devices with many configurations and interfaces
- Highly portable embedded architecture
- Scalable (allows choosing of the required features)
- Highly configurable
- Complete support for all USB 2.0 and OTG controllers:
 - High, Full and Low speed data rates
 - Control, bulk, interrupt and isochronous transfers
 - OTG Host Negotiation Protocol
 - OTG Session Request Protocol
 - Power saving modes
- Written in ANSI-C
- CPU independent
- OS independent
- Linux-like API to USB Driver Module

Functional Description

The USBHS-OTG-SD Software Stack is partitioned into modules as shown on the block diagram and described below.

Software stack API

This layer contains high level Linux-like functions for host and device modes with some API functions common to both of them. They make it possible to initialize the software stack and manage the data.

Device Driver

The Device Driver contains a module responsible for interrupt service so that the user does not have to handle interrupts in the enumeration process manually. They are executed automatically. Since the requests coming from the host are different than standard requests, they are redirected to the user defined code segments. This solution allows building of USB defined class modules. Similarly to the host-side stack, all requests to lower layers are processed by issuing USB Request Block Structure commands.

Host Driver

The Host Driver module is an abstraction of the Evatronix Controller Interface. It contains functions responsible for forming message frames defined in the USB Specification. It is also responsible for device enumeration, data transfers, status reporting, and errors recovery.

OTG Driver

The OTG Driver is responsible for detection of all changes on an OTG hardware port. It switches the program context to suitable code segments depending on the detected events on an OTG port. The main code segments are host application and device applications. Additionally, the OTG driver can call other user defined code segments for corresponding OTG Finite Machine States which are used mostly for debugging purposes. The OTG Driver operates directly on the core registers.

USB Hardware driver

This block implements an interface between the hardware part and higher software layers. It operates directly on USB controller registers and should be written individually for different USB controllers.

Deliverables

- Software Stack C source code
- User documentation
- Example applications for host and device modes

Related Products

USBHS-OTG-SD – a USB Hi-Speed On-The-Go controller for single devices that provides USB Dual-role device interface according to the 2.0 revision of the USB specification and its On-The-Go supplement.

USBHS-OTG-TLM – Transaction level model of the USBHS-OTG-SD IP core.

Available Class Drivers

- Device mode:
 - USB Audio Class – Microphone Device
 - USB Audio Class –Speaker Device
 - USB CDC ACM Subclass Device
 - USB Mass Storage Class Device
 - USB RNDIS Class Device
 - USB Video Class Device
 - USB Video Extension Unit Device
- Host mode:
 - USB HID Class Host
 - USB Mass Storage Class Host

Support

The software stack as delivered is warranted against defects for ninety days from purchase. Thirty days of phone and email technical support are included, starting with the first interaction. Additional maintenance and support options are available.