ZOpen™ Application Development Framework

ZSP™
DSP Freedom

OPEN-ARCHITECTURE ENVIRONMENT TO ACCELERATE DESIGN OF ZSP™ APPLICATIONS

OVERVIEW

The ZOpen™ framework enables efficient ZSP application development and promotes integration of algorithms from best-in-class providers to facilitate accelerated time-to-market for ZSP users. The framework's software environment improves development efficiency by providing a standardized integration methodology, allowing algorithms from multiple vendors to be used while maintaining hardware abstraction. The ZOpen framework consists of a rules-based specification to standardize application development, high-level application programmer interfaces (APIs), low-level physical interface drivers, an application module for execution control and a software validation utility. The ZOpen framework is designed to leverage third-party algorithms and real-time operating systems (RTOSes) to give maximum flexibility to application developers. All ZSP platforms, including licensed designs, ASICs and ASSPs, benefit from the ZOpen framework.

ZOPEN ARCHITECTURE

The ZOpen framework's architecture is modular with well-defined interfaces between functional modules. This architecture provides an open environment that enables the use of customized modules to meet application requirements. The ZOpen framework's architecture is comprised of three components: Application Module, Algorithm Modules and Platform Interface Module. Figure 1 provides a block diagram that shows the architecture of the ZOpen framework.

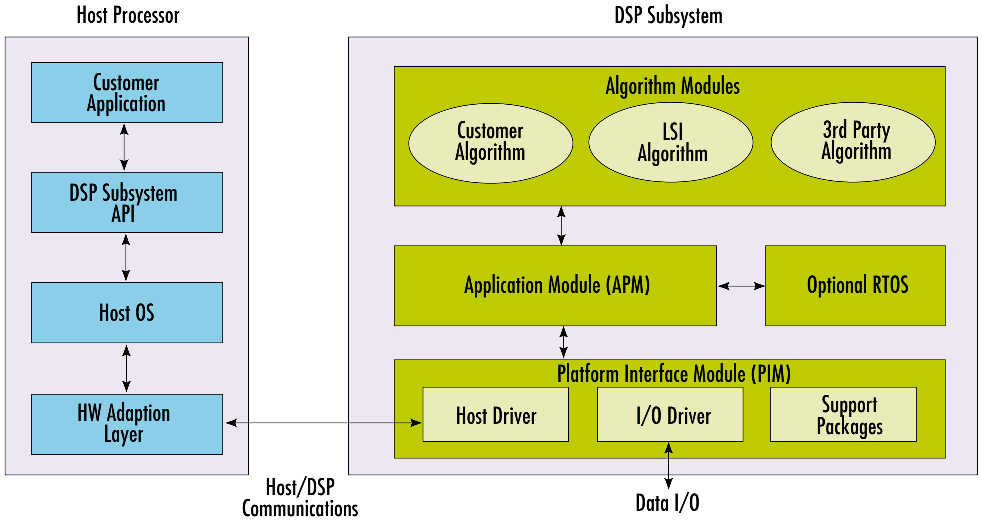

Figure 1. ZOpen Framework Architecture

FEATURES

- Standardized ZSP application development framework
- Open and scalable architecture for application flexibility
- Supports integration of algorithms from multiple vendors
- Supports optional use of third-party RTOS
- Provides hardware abstraction to simplify development effort
- Minimally intrusive (low memory/processing requirements)
- Host communications support (e.g., ARM/MIPS host)
- Supports licensed core, ASIC and ASSP application development

BENEFITS

- Improves software development process
- Accelerates ZSP application development cycle
- Reduces time-to-market
- Reduces technical risk
- Simplifies system integration efforts
- Supports future growth and changes in application requirements
- Enables turnkey solutions for customers
- Portability across ZSP devices and hardware platforms

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ZOpen Application Development Framework

APPLICATION MODULE (APM)

The Application Module is the application layer in the ZOpen framework that interfaces with the Algorithm and Platform Interface Modules.The APM can address single algorithm/single port applications, as well as multiple algorithms/multi-port applications. The APM is responsible for task scheduling, algorithm execution and high-level I/O control. The ZOpen framework is delivered with an example APM that can be used as the basis for application development. ZOpen does not impose a proprietary executive or RTOS, so the application developer has the freedom to select an appropriate RTOS if needed. There are ZSP Solution Partners that provide a range of RTOSes.

ALGORITHM MODULES

The Algorithm Modules provide hardware-independent functions of the application such as voice and audio compression, echo cancellation, fax/modem processing and caller ID functions. The Algorithm Modules provide the functions required to implement multimedia, wired/wireless communications and other ZSP applications. A key aspect of Algorithm Modules is that they are designed to the ZOpen Application Interface Specification (ZAIS) which ensures successful integration of modules from multiple vendors reducing technical risk and time-to-market. LSI Logic and our ZSP Solution Partners provide a wide array of Algorithm Module offerings that are compliant with ZOpen framework.

PLATFORM INTERFACE MODULE (PIM)

The Platform Interface Modules are the key to providing application developers with hardware abstraction. PIMs provide a high-level API for the APM to access host communications, serial data streams and processor peripherals as needed by the application. All the low-level device driver details are handled internally by the PIMs, allowing application developers to be freed from needing detailed ZSP hardware expertise. The PIMs consist of a collection of device drivers and support libraries. The use of the PIM high-level APIs by the application allows portability across ZSP platforms. The ZOpen framework is shipped with example applications that show how to use the PIM APIs.

ZSP SOLUTION PARTNERS

LSI Logic's ZSP Solution Partners offer a wide range of ZOpen compliant algorithms. Partner participation has swelled over the past year, based on the growing industry acceptance of LSI Logic's ZSP technology and open architecture strategy. ZOpen framework's ability to integrate algorithms from multiple vendors into a single application benefits ZSP customers by reducing time-to-market and development costs.

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