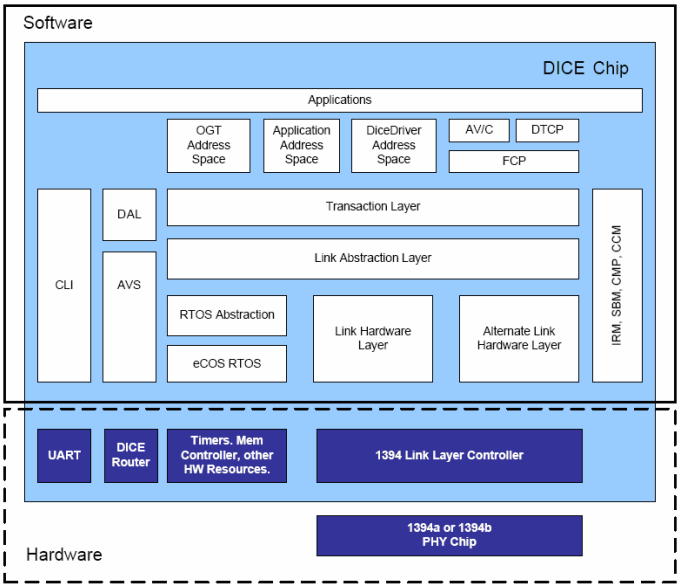
DICE Embedded Software Stack



The DICE Embedded Software Stack has been field proven in tens of thousands of shipping products since 2001.

Applications Product-specific application code.

Address Spaces The firmware handles transactions in 1394 Address spaces, which are used to implement Host-Target, Target-Target protocols, and Host Driver Models.

ARM DSP Since all 1394 streaming and routing is performed in hardware, the ARM is available to do rudimentary DSP. The ARM can transmit and receive 8 Channels of audio to and from the DICE router. (DICE Jr and DICE Mini have built-in hardware mixing and peak detect capabilities)

AV/C General, Audio Subunit and Music Subunit among many others, Extended Stream Format Info Commands, Connection and Compatibility Management (CCM), etc.

DTCP This module is available with the DTCP version of the DICE II.

FCP Function control protocol as specified by IEEE1394, currently used by AV/C.

CLI The extensible Command Line Interpreter (CLI) can be accessed via a serial terminal for control of software functions, diagnostics, and application prototyping.

DAL, AVS Most streaming-related application function calls are made to the DAL. The DICE Abstraction Layer and Audio Video System manage media streaming through the DICE router and is the interface for configuring 1394 bus formats and synchronization.

Transaction Layer Virtually any 1394 protocol can be implemented with the DICE. High level API's are provided for 1394 bus accesses here.

LAL – Link Abstraction Layer The Link Abstraction Layer provides a common, platform-independent, API for application code.

LHL – Link Hardware Layer The Link Hardware Layer provides access to common Link and PHY layer configuration and diagnostics.

RTOS Abstraction/eCOS RTOS Provides a common interface for platform independent OS services. eCOS is the chosen RTOS in the current version of the software stack.

IRM, SBM, CMP Standard Isochronous Resource Manager, Serial Bus Manager, and Connection Management Protocol API's.

Peripheral Drivers RTOS drivers are provided for chip-specific functions, such as Memories and flash file system, UART / MIDI, GRAY encoder-decoders, timers, I2C, SPI, etc.

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DICE – Firmware SDK

The Software Development Kit (SDK) for the DICE Embedded Firmware Stack makes it easy for developers to customize the firmware for their products.

DICE Firmware SDK

- Windows-based cross development for DICE II, DICE-JR and DICE-MINI devices using Cygwin, gdb, and Insight graphical debugger.
- Implemented in C, C++ (RTOS) and ARM assembler.
- Intuitive and flexible API's support implementation of virtually any 1394 protocol.
- An efficient RTOS abstraction layer.
- Comprehensive, extensible embedded Command Line Interpreter (CLI) for diagnostics, debug, and applications development.
- FLASH software updates via serial port or over the 1394 bus.
- Media streaming is handled entirely by the DICE Audio Video System (AVS), or can be optionally routed through the integrated ARM processor. Streaming performance is deterministic.
- OGT Support allowing a generic enabler to enact with the transporter node.
- AV/C General and many optional subunits are available. Working AV/C Music Subunit application included.

Ease of Development

- Intuitive and flexible API's enable rapid application development.
- Separately available Host development software for Windows and Mac application development. Using cross-platform PAL driver interface gives developers a number of choices for Host software interfacing, and provides an number of useful development, test and benchmarking utilities.
- Standard serial terminal CLI, with comprehensive command set.

Low Cost of Entry

- Low cost Evaluation Modules are provided with sample applications.
- Royalty-free RTOS and Software Stack, and serial debug minimizes start up cost.
- JTAG debugging is also supported.

Distribution SDK Installer

All tools, libraries, and documentation provided in stable, versioned releases, including:

- Complete, automated installer automates Cygwin installation, GNUARM tools installation, Graphical Emacs installation, DICE source code, etc.
- Straight-forward Upgrade from 2.x to 3.x SDK.
- Royalty-free DICE 1394 Embedded Software Stack sources.
- Stabilized eCos source distribution.
- Standard gdb debugger, with graphical debugger included.

Support

- Comprehensive documentation is included with the SDK distribution, and available online.
- Online discussion forums are monitored and moderated by FAE's.

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