Nexperia Home 8550 Software Development Kit

Reference hardware, system software, and application development tools for the PNX8550 home entertainment engine

This complete, assembled reference platform gives ISVs and other Nexperia Home Partners everything they need to create applications and libraries for TV, set-top, and home media server products based on the Nexperia PNX8550 home entertainment engine.

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Key features

- Complete, assembled kit includes PNX8550-based reference hardware, system software, A/V streaming software layer, operating systems, demo and sample applications, test streams, diagnostic software, software tools, and documentation
- Host-based application development and standalone demo modes
- Development of streaming media applications simplified through the Nexperia Home API
- Includes basic analog TV functions for worldwide analog TV standards
- Available to ISVs and other third parties through Nexperia Home Partner Program

The Nexperia™ Home 8550 software development kit (NH-8550 SDK) is a flexible reference platform for developing and demonstrating software applications for the Philips Nexperia PNX8550 home entertainment engine. This complete, assembled kit gives ISV and other third-party software developers everything they need to create applications and libraries for TV, set-top boxes, and home media server products. It is available through the Nexperia Home Partner Program.

As delivered, the NH-8550 SDK is configured with basic TV functionality supporting simultaneous tuning and decoding (or input) of two worldwide analog TV signals (PAL, SECAM and NTSC). It can also decode digital still image picture formats and various MPEG audio standards. Audio features such as volume, bass and treble control, and downmix to headphones can be applied to audio from any source before output. The NH-8550 SDK also supports capture of a variety of data services in analog and digital domains and many optional features.

The Nexperia PNX8550 Home Entertainment Engine

The Nexperia PNX8550 is a highly integrated media processor for building mid- to high-end analog/digital and digital TV receivers with advanced TV and connectivity features. On a single chip, the PNX8550 integrates conditional access, MPEG-2 transport stream demux, video decoding, high-quality video enhancement, audio decode and mixing, graphics generation, image composition, and display.

The PNX8550's powerful MIPS32 and TriMedia processor cores work together with on-chip units to efficiently handle control, communications and media processing functions in hardware and software. The MIPS32 PR4450 core controls and balances all on-chip functions; two TriMedia TM3260 cores handle real-time media tasks, many advanced video enhancements, and all audio operations.

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Simplified development of streaming media features

The SDK enables application development in a host-supported environment in which software is developed on a host system (such as a PC) is downloaded to the SDK's reference hardware through an EJTAG connection. Peripheral interfaces and devices are also accessible for programming and debugging through the EJTAG interface. Control and user interface applications for the MIPS core are developed using OS and connectivity APIs. Development of streaming media applications is simplified through the Nexperia Home API (NHAPI). The NHAPI is implemented through a high-performance streaming A/V software layer that abstracts the programming interface to the task level through 'use cases.' Use cases automatically handle both the streaming media processing tasks and all the associated setup steps for these tasks like task prioritization, memory allocation, buffer management, A/V synchronization, etc. The NH-8550 SDK supports the folllowing use cases:

- Single window video
- Dual window video
- Split screen video
- Media streaming

Standalone (no host) demo mode

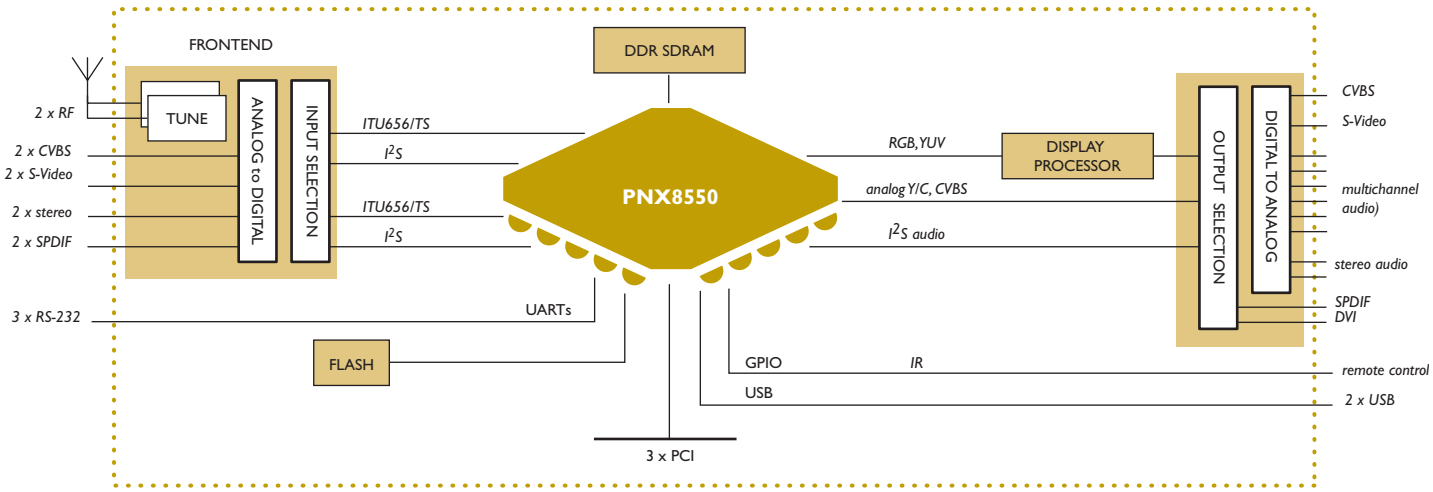
The SDK also supports a demo mode that does not require connection of a host system. In this mode, a preloaded demo executes on power up, allowing user interaction through a keyboard, a mouse, tuner inputs, the remote control, or front panel buttons. It outputs video through DVI or CVBS connections for display on a monitor. In demo mode, all peripherals can be controlled and simple control commands can be given for programming and debugging purposes.

SDK content

The complete NH-8550-SDK includes reference hardware, development tools, system software, operating systems, A/V streaming software, demo/sample application, development tools, and documentation.

Reference hardware

Housed in a closed chassis with a power supply, the reference hardware is preconfigured for TV system development. The SDK chassis cover can be easily removed for debugging or configuration. Six push buttons on the front panel can be programmed through the application software to provide simple control functions. A programmable Philips iPronto® remote control and cables (power, audio, video, and data) are included.



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The SDK reference backplane allows connection of a variety of input sources such as composite video, S-Video, component video, and direct digital data streams. It outputs to display devices such as CRT TV, plasma screen, LCD display or projector through analog (CVBS) or digital (DVI) connections. The SDK also includes standard connectivity and control interfaces such as RS-232, USB, infrared (remote control), GPIO, and UARTs. For future enhancements the SDK may be extended with additional modules and PCI cards.

Software, development tools, operating systems

The SDK includes system software, software development tools, the streaming A/V software layer (NHAPI), operating systems, and related software documentation. For the MIPS processor, the SDK includes the WindRiver® Platform for Consumer Devices (VxWorks RTOS, Flash File System, USB stacks, 2D Graphics and media library, many networking protocols and stacks for the MIPS processor) and an evaluation license of the WindRiver Tornado tool suite. Extension can be licensed as needed by the user with WindRiver. The Kit also includes support for the WindRiver WindPower ICE EJTAG debugger board. For the TriMedia processor, the pSOS RTOS is included. A streaming A/V software layer provides the programmer interface for the NHAPI.

Board support package

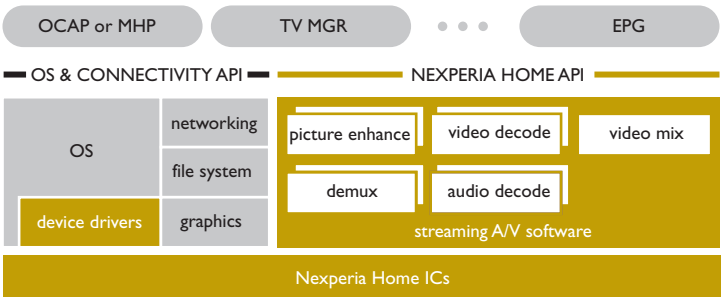
The board support package includes source for board support libraries such as boot, kernel and peripheral support, as well as drivers for emulators and host drivers for communication between the board and a host development platform.

Sample software, demo, test streams, and diagnostic software

A set of example/reference applications demonstrate SDK hardware and streaming A/V software features. Provided as source code, they can be used as a basis for developing more complex applications. A demo application highlights the SDK's major features such as dual-stream processing or accepting and processing IR or front-panel input, etc. Test streams can be used to demo the basic capabilities of the SDK and codec libraries and for debugging. Diagnostic software enables testing of functionality and connectivity of the SDK hardware and interfaces.

Maintenance and support

The SDK include support services such as e-mail and phone technical support, access to web-based development resources such as problem tracking, and a support database. Training can be provided on request.



The NH-8550 SDK's Nexperia Home-compliant software architecture leverages the NH-API to simplify development of streaming tasks.

Technical specifications

Kit content

Reference hardware	Encased chassis, reference board
Operating systems	*MIPS* WindRiver Platform for Consumer Devices (VxWorks RTOS, Flash File System, USB stacks, 2D Graphics and media library, networking protocols and stacks for MIPS)
	TriMedia pSOS RTOS
Development tools	*MIPS* WindRiver® Tornado tool suite for MIPS (evaluation license. Extension can be licensed as needed by the user with WindRiver.)
	Support for the WindRiver WindPower ICE EJTAG debugger board.
NHAPI	For application development on TriMedia cores; provided through streaming A/V software layer
NHAPI use cases	single window video, dual window video, split screen video, media streaming
Other software	*drivers* for remote control, front panel buttons
	demo executable object
	diagnostics executable object
Cables	Power cord, 4 CVBS cables, 3 S-Video cables, one set of stereo audio cables, 1 DVI cable
Documentation	NH-API Technical Description
	VxWorks OS for MIPS
	pSOS OS for TriMedia and tuner modules
	WindRiver Tornado Tool Chain User Guide
	Getting Started manual
	Board level documentation, circuit diagrams

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Technical specifications (continued)

Media interfaces

A/V input	2 RF connections (for TV signals), 2 CVBS connectors, 2 S-Video connectors, 2 pairs stereo audio connectors, 2 SPDIF connectors
A/V output	1 CVBS connector, 1 S-Video connector, 1 DVI connector, 3 pairs audio connectors (for multi-channel audio), 2 25-watt stereo audio outputs (for speakers), 1 SPDIF connector, 2 stereo audio outputs (for headphones)

Control and connectivity interfaces

Infrared	1 port on front panel
Front panel	6 programmable push buttons
USB	2 external USB v1.1 (host) connectors
RS-232	3 external RC-232 (serial) connectors
EJTAG	internal EJTAG connector
PCI	3 internal PCI slots
UART	2: 1 ISO-7816 specific for Smart Card application and 1 glueless interface to TDA8004

Functions

Tune	Up to 2 simultaneous: PAL/SECAM (all variants) and/or NTSC (all variants)
Analog audio decode	Dual FM, A2, Nicam, Dolby® Pro Logic®, FM radio
Digital video decode	Decompress MJPEG, MJPEG2000
Digital audio decode	MPEG-1 Layer I and II, MPEG-2 MC Extension, MPEG-1 Layer 3 (MP3), MP3PRO
Audio features	Volume, bass, and treble control and adjustment, , down-mix output to headphones for mains or to headphones for PiP or double window.

Data services

Channels	Via two VBI capture units; 652-line WST teletext, 525-WST teletext, NABTS, Closed Captioning, WSS, and VPS data

Video output

incoming digital	1280x768@50P and 1280x768@60P
incoming 50 Hz	720x576@50I or 720x288@50P
incoming 60 Hz	720x480@60I or 720x240@60P

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Date of release: January 2004
document order number: CES04-PRELIMINARY
Published in The Netherlands

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