Nexperia Personal Media Player Reference Design

Complete PNX1500-based solution for portable player/recorders with high-resolution video and audio

Personal media players let consumers enjoy photos, movies, music, TV and other digital content everywhere they go. The Nexperia Personal Media Player Reference Design gives manufacturers everything they need to address the growing market opportunity for portable media players and recorders.

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The Philips Nexperia Personal Media Player Reference Design combines high-quality digital audio and video processing, wired and wireless connectivity, and exceptional picture quality to give manufacturers a flexible platform for developing portable media player and recorder devices. The reference design leverages a single Nexperia PNX1500 media processor to decode and encode most popular and emerging audio and video formats including DivX, MPEG-2, MPEG-4, MP3, AAC, and more. Glueless connections to a hard disk drive, portable Flash cards, and an LCD display lower the BOM even further and support a host of features and form factors. The reference design includes a transflective LCD display, ideal for low-light indoor and outdoor use. Its compact size and light weight enable highly portable, ergonomic player designs.

Key features

- Complete kit includes low-BOM reference board based on Nexperia PNX1500 media processor, miniPCI daughter card (802.11), LCD display, and software
- Supports record and playback of most standard digital audio or video formats including DivX, MPEG-2, MPEG-4, MP3, AAC, and more
- Robust image enhancement features, motion-adaptive deinterlacing, and high-quality upscaling
- Support for hard disk, CompactFlash®, and Memory Stick™; expansion to other formats
- Connectivity to PCs, home entertainment appliances, and other portable devices
  - On-board USB 2.0 and USB OTG
  - Industry-leading, low-power 802.11a/b/g
  - Expansion for Bluetooth or RS232
- Includes widescreen, transflective, 5-inch VGA TFT LCD display; can output up to HD video for external big screen display
- Advanced Philips PMU+ power management unit IC

Using the reference design, manufacturers can tailor storage, display, and media processing functionality to differentiate a variety of appealing player and recorder products enabling consumers to:

- download high-quality music, movies, and photos from a PC, the Internet, home entertainment appliances, or other portables
- record high-quality audio, video, or TV
- view/listen to hours of stored media anywhere
- view photos or video from cameras or portable Flash devices
- use the player as a wireless media adapter to enjoy PC and Internet media content in the living room
- play stored music or full-resolution movies by connecting the player to a home theatre display or speakers
- stream live TV or watch recorded TV or Internet content throughout the house
- browse the web from the backyard or in WiFi hotspots
- read electronic books

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Wired and wireless connectivity

For secure wireless connectivity, the reference design features Philips' industry-leading, low-power 802.11a/b/g chipset. An on-board USB 2.0 Hi-speed device streamlines media downloads from personal computers and other USB-compatible products. A USB OTG device controller enables players to exchange media files with other portable devices.

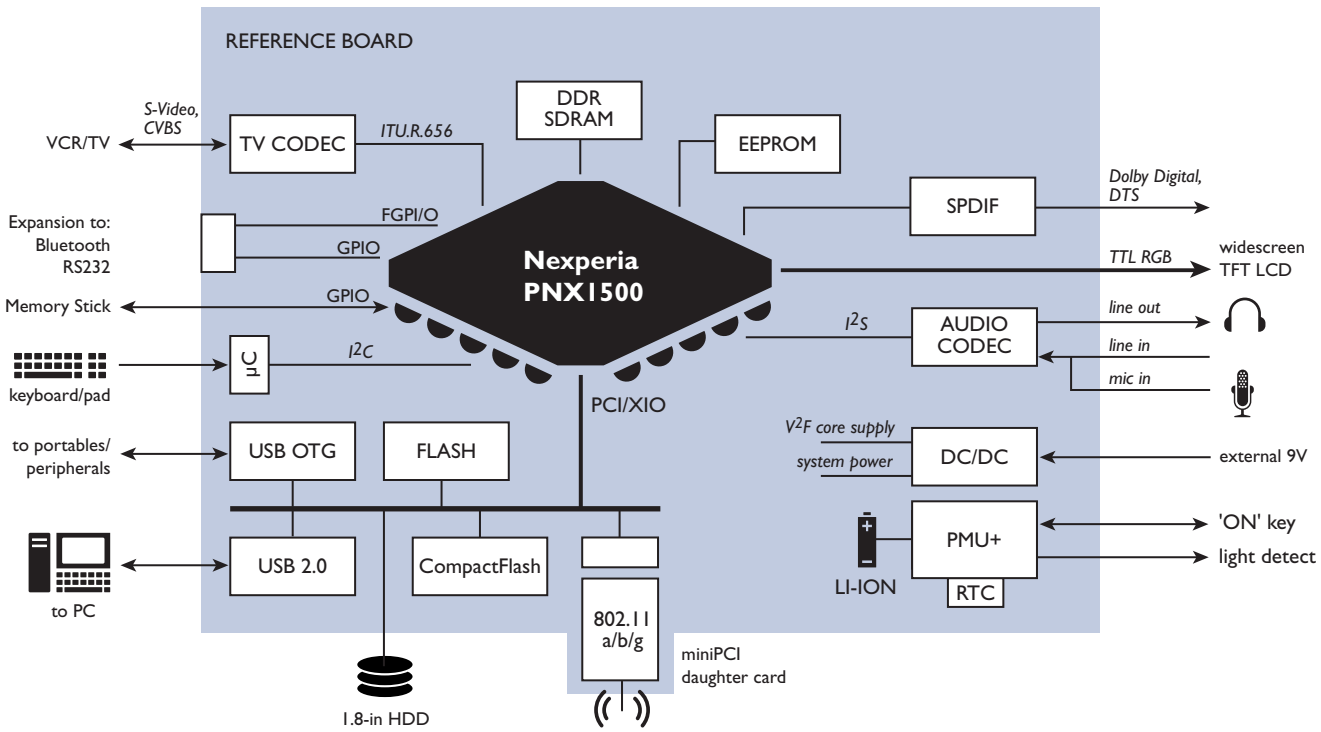
Flexible storage and expansion options

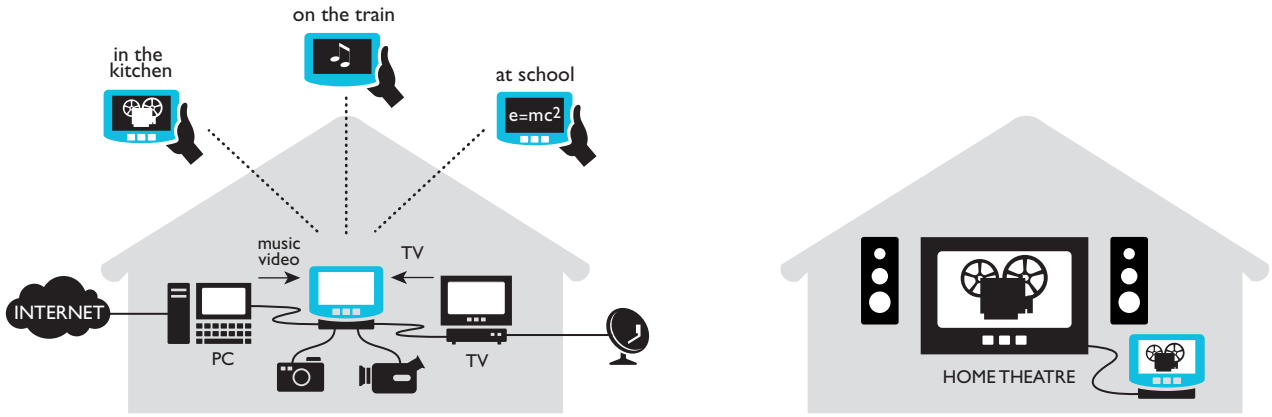
A choice of storage/recording media lets manufacturers tailor product features and price points. A 30-GB hard disk drive (IDE interface) offers high-capacity media storage and supports PVR applications. On-board support for Memory Stick and CompactFlash cards is included; other portable Flash formats can be supported through an expansion bus.

Exceptional picture/video quality

The reference design leverages the PNX1500's advanced image and video enhancements to deliver exceptional picture quality on LCD displays. Advanced motion-adaptive deinterlacing with optional edge detection/correction eliminates the need for an external chip to support progressive output. The on-chip graphics engine accelerates high-speed 2D graphics. An integrated TFT LCD controller enables direct LCD output and supports video resolutions up to WXGA TFT LCD (1280 x 768 60 Hz) or SD/HD video (up to 1920 x 1080 60i). For generating high-quality video on internal or external displays, the PNX1500 handles high-definition video scaling, linear and non-linear aspect ratio conversion, anti-flicker filtering, brightness control, and a long list of video quality enhancements.

Personal Media Player Reference Design block diagram





Download media content from a PC, the Internet, even digital still and video cameras for enjoyment later (left); use in the living room as a personal video recorder or to play stored movies, pictures, or music using home theatre display and speakers (right).

Based on the Nexperia PNX1500 media processor

The reference design is based on a Nexperia PNX1500 media processor. The PNX1500 leverages a powerful C/C++ programmable TriMediaTM3260 CPU and runs a small real-time operating system enabling efficient and predictable response to real-time events. Independent, on-chip, I/O and coprocessing units capture and format datastream I/O and accelerate multimedia algorithms. A sophisticated memory hierarchy manages internal I/O and streamlines access to external memory. The PNX1500 also supports dynamic power management, lowering power consumption and conserving battery charge.

Software/development tools

Available separately from Philips, the Nexperia Development Kit (NDK) gives developers a full suite of system software tools to develop applications for the PNX1500's TriMedia CPU. It includes a compiler, debugger, A/V drivers, and example software. This comprehensive software development environment dramatically lowers costs and reduces time-to-market by enabling development of multimedia applications entirely in the C and C++ programming languages. Application libraries for the PNX1500 are available from Philips and third parties; for a complete, up-to-date list, visit: www.semiconductors.philips.com/nexperia/application-libraries.

Technical specifications

REFERENCE DESIGN

Hardware	PNX1500-based reference board, miniPCI daughter card housing 802.11 a/b/g transceiver
Display	5-inch, transflective, switchable, VGA (640 x 480) with touch panel
Software	LCD drivers, audio/video drivers, HDD file system, demo applications
Documentation	User Guide, schematics, Gerber files

REFERENCE BOARD

Media processor	PNX1501, 266-MHz TriMedia CPU
Memory	64 MB DDR SDRAM (2x32) 8 MB NAND Flash
PCI/XIO bus	32-bit, 33-MHz
Hard disk	1.8-in, 30-GB HDD with glueless IDE interface
Portable Flash	Memory Stick and CompactFlash; other formats via expansion bus
TV codec	Philips SAA7108; encodes up to 800 x 600 resolution PAL or NTSC; decodes PAL, NTSC, SECAM
Audio codec	Philips UDA1380 stereo codec
Connectivity	Philips ISP1583 USB 2.0 Hi-speed device Philips ISP1362 USB OTG host/device controller (mini AB connector)
Audio	*input* mini-jack line in (from microphone) *output* mini-jack line out, headphone out, SPDIF out
Video I/O	*input* CVBS/S-Video *output* CVBS/S-Video, component video (YPbPr or RGB)
Display I/O	18-bit, RGB LCD interface
User interface	8-bit microcontroller for keyboard/keypad
Power	*power management unit* Philips PCF50606 PMU+ *supply voltage* 3.3 V I/O *battery* 3.7 V 3600-mAh Varta PolyFlex *DC/DC converter* Philips TEA1211

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Technical specifications (continued)

DAUGHTER CARD

Form factor	miniPCI
Connectivity	Philips low-power 802.11a/b/g chipset: BGW100 RF SiP + SA2443 baseband/MAC

SUPPORTED MEDIA FORMATS[1]

Video decode	MPEG-1, MPEG-2, MPEG-4 (SP, MVP, ASP), DivX-3/4/5, DV, H.263, H.264, H.324, WMV9
Video encode	MPEG-1, MPEG-2, MPEG-4 (SP, MVP), DivX (Full D1 resolution, VBR), H.263
Audio decode	MP2, MP3, MP3PRO, DTS, Dolby Digital, AAC, Dolby Pro Logic, Pro Logic II, WMA
Audio encode	MPEG-1 L2, MP3, AAC, G.7xx
Image decode	JPEG, JPEG2000, FLASH
Communications	TCP/IP, V.90, Ethernet, 802.11x, Universal PnP, DHCP/DNS, RTP/RTCP/RTSP, SMS

[1] Application libraries are available from Philips and third party companies. Visit www.semiconductors.philips.com/nexperia/application-libraries for an up-to-date list of libraries.

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