# 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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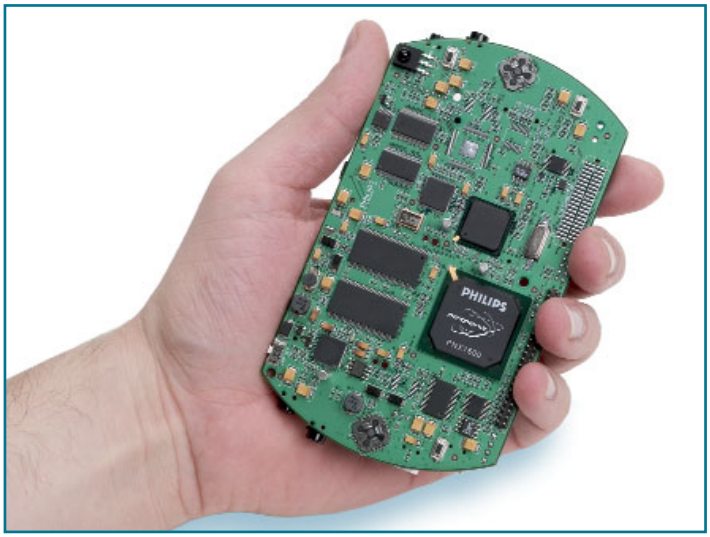


### Key features

- Complete kit includes low-BoM reference board based on Nexperia PNX1500 media processor, 802.11a/g type IIIB MiniPCI card, LCD display, and software
- Supports record and playback of most standard digital media formats including DivX® video, MPEG-2, MPEG-4, AVC/H.264, Windows Media 9, MP3, AAC, JPEG and more
- Robust image enhancement features, motion-adaptive deinterlacing, and high-quality upscaling
- Support for hard disk, CompactFlash®, Memory Stick™, and SD cards; expansion to other formats
- Connectivity to PCs, home entertainment appliances, and portables
  - On-board Hi-Speed USB and Hi-Speed USB On-the-Go
  - Industry-leading, high-performance 802.11a/g
  - Expansion for Bluetooth® or RS232
- Includes 3.5-inch QVGA TFT LCD display
- Can output up to HD video for external big screen display
- Advanced Philips PMU+ power management unit IC

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 building portable media player and recorder devices. The reference design leverages a single Nexperia PNX1500 media processor to decode and encode most popular and emerging media formats including DivX video, MPEG-2, MPEG-4, AVC/H.264, Windows Media 9, MP3, AAC, JPEG, and more. Glueless connections to an LCD display (included), a hard disk drive, and portable Flash cards lower the BoM further and support a host of features and form factors.

The reference design's compact size and light weight enable highly portable, ergonomic designs. 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 storage devices
- use the player as a wireless media adapter to enjoy PC and Internet media content in the living room

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- 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 online multimedia content from the backyard or in any Wi-Fi hotspot
- read electronic books

### Wired and wireless connectivity

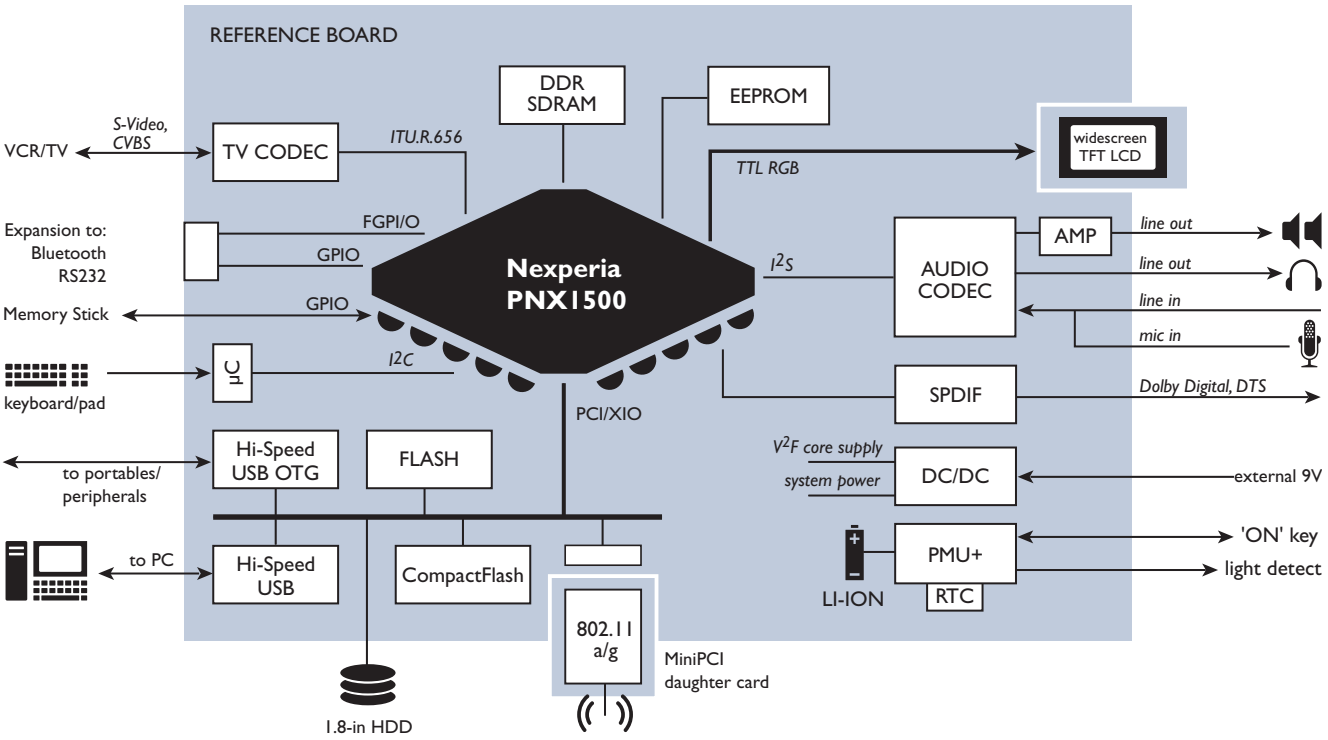
For secure wireless connectivity, the reference design features Philips' high-performance 802.11a/g chipset. A Hi-Speed USB peripheral controller streamlines media downloads from PCs and other USB-compatible products. A Hi-Speed USB On-The-Go (OTG) host/peripheral controller lets players exchange media files with other portable devices.

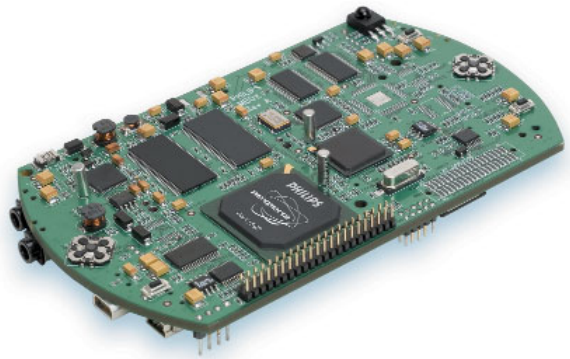
### Flexible storage and expansion options

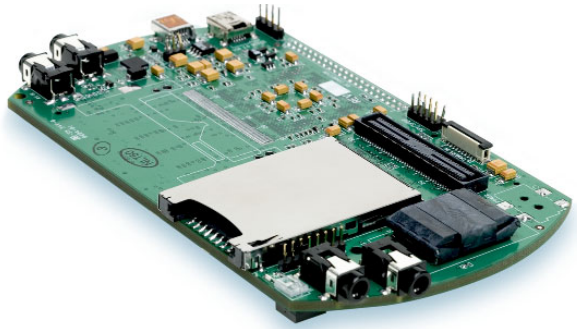
A choice of storage/recording media lets manufacturers tailor product features and price points. A 30-GB hard disk drive (IDE interface) offers high-capacity media storage and supports PVR applications. On-board support for Memory Stick, SD, and CompactFlash cards is included; other portable Flash formats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

## 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 TriMedia TM3260 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 and 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, audio/video drivers, and example software. This comprehensive software development environment dramatically lowers cost 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** | PNX1511-based reference board; 802.11a/g type IIIB MiniPCI card (based on Philips high-performance 802.11a/g chipset: SA5250 baseband/MAC and SA5251 RF transceiver) |
| **Display** | 3.5-inch, switchable QVGA (320 x 240) included; other displays such as 7-inch WVGA 800x480 are supported through a daughterboard |
| **Software** | LCD drivers, audio/video drivers, HDD file system, demo applications |
| **Documentation** | User Guide, schematics, Gerber files |

### Reference board

| | |
|---|---|
| **Media processor** | Nexperia PNX1511, 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, SD card, and CompactFlash; other formats via expansion bus |
| **TV codec** | Philips SAA7109A; encodes up to 800 x 600 resolution PAL or NTSC; decodes PAL, NTSC, SECAM |
| **Audio codec** | Philips UDA1380 stereo codec |
| **Connectivity** | Philips ISP1583 Hi-Speed USB peripheral controller with direct interface to ATA/ATAPI; Philips ISP1761 Hi-Speed USB OTG host/peripheral controller (mini AB connector)<br>miniPCI slot for 802.11 a/g card, SPI header for low-power 802.11 b and b/g card<br>Fast UART header for Bluetooth card<br>Infrared receiver and blaster |
| **Audio** | *input* mini-jack line in, microphone<br>*output* mini-jack line out with inline 1W TDA8552 amp (to stereo speakers), headphone out, SPDIF out |
| **Video I/O** | *input* CVBS/S-Video<br>*output* CVBS/S-Video, component video (YPrPb interlaced and progressive or RGB/DVI up to WXGA) |
| **Power** | *power management unit* Philips PCF50606 PMU+<br>*supply voltage* 3.3 V I/O<br>*battery* 3.7 V 3600-mAh Varta PolyFlex<br>*DC/DC converter* Philips TEA1211 |

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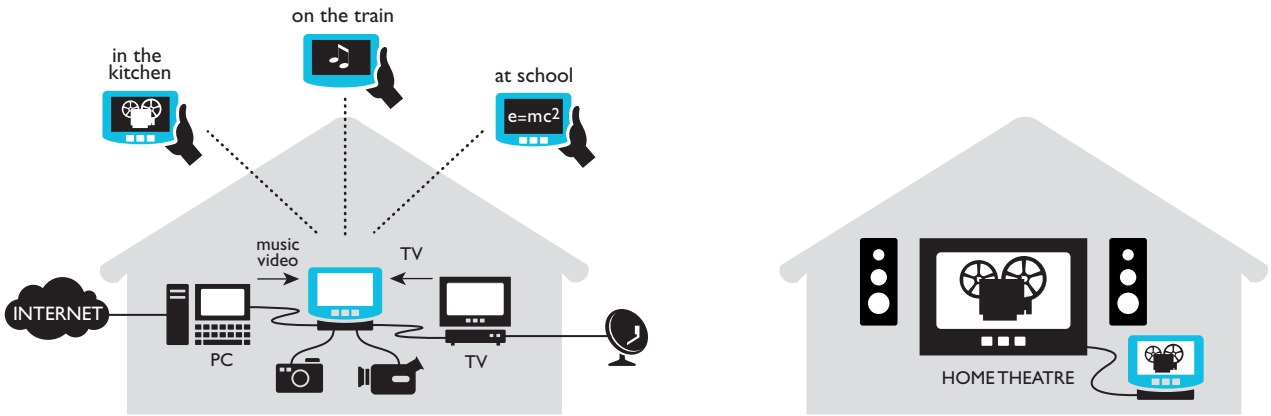


*Download media content from a PC, the Internet, even digital still and video cameras for enjoyment later (left); use in the living room as a personal video recorder or to play stored movies, pictures, or music using home theatre display and speakers (right).*

### Technical specifications (continued)

| | |
|---|---|
| **Display I/O** | 18- or 24-bit, RGB LCD interface |
| **User interface** | 8-bit microcontroller for keyboard/keypad |
| **Security** | Philips P5CT072 with SmartMX technology enabling digital rights management |

### Supported media fomats[1]

| | |
|---|---|
| **Video decode** | MPEG-1, MPEG-2, MPEG-4 (SP, ASP), DivX-3/4/5, DV, H.263, AVC/H.264, WMV9 |
| **Video encode** | MPEG-1, MPEG-2, MPEG-4 (SP), DivX video, H.263, AVC/H.264 |
| **Audio decode** | MP2, MP3, DTS, Dolby Digital®, Dolby Pro Logic® II, AAC, WMA9, G.7xx |
| **Audio encode** | MPEG-1 L2, MP3, AAC, G.7xx |
| **Image decode** | JPEG, JPEG2000, GIF, BMP |
| **Communications** | TCP/IP, V.90, Ethernet, 802.11x, Universal PnP, HTTP, RTP/RTCP/RTSP |

*[1] Visit www.semiconductors.philips.com/nexperia/application-libraries for a complete up-to-date list of application libraries from Philips and third-party companies.*

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