MOMENTUM DATA SYSTEMS

http://www.mds.com

# Consumer Photo & Media Display Reference Design

MDS' Consumer Photo and Media Display design offers developers a complete platform for creating media display products ranging from simple flash storage JPEG players through fully networked multi-standard video players.

MDS' Consumer Photo and Media Display is available both as a demonstration platform and as a complete reference kit supplied with schematics, bill of materials, and gerber files. MDS enhances this hardware platform with a rich selection of software offerings and development tools.

LCD displays up to 1366/8 x 768 can be connected to designs based on the pnx1500.

The pnx1500 processor's built in deinterlacing and video scaling hardware provides true high quality display of standard definition content scaled to the exact LCD display resolution. The chips' built in output video processor also provides picture quality enhancement.

The mini-PCI expansion connector can be used to add user developed 802.11 capability. Drivers for Atheros based 802.11a/b/g cards are available.

The basic hardware platform can be ordered with optional audio and video decoder libraries, including MP3, MPEG2, MPEG4, Divx, WMT, and H.264. Please see the MDS website for more information on libraries.

## Basic Photo Display with less than US$ 50 PCB BOM

Shown to the right is a block diagram of a possible derivative of the Consumer Photo and Media Display reference design that uses a minimal number of components. In large volumes the typical BOM (excluding LCD, backlight, and case) is less than US$ 50.

While typically used for JPEG photo display, it has enough power to display DVD quality (720 x 480/576 for NTSC/PAL) MPEG2 or MPEG4 content, and with an additional DDR chip can handle Windows Media or H264 content.

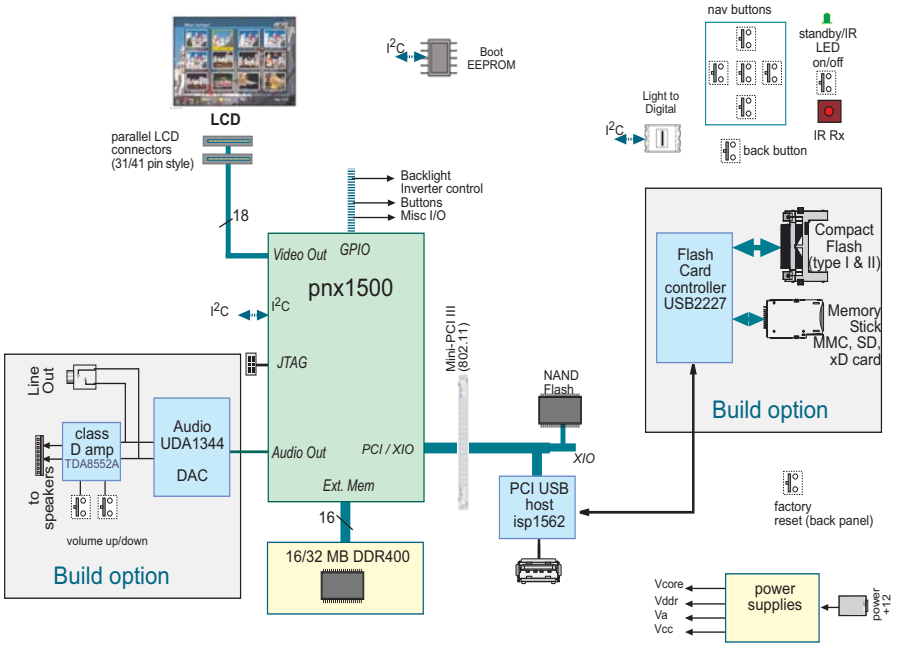
## Off the shelf application software

Third party middleware and player environments from companies such as Ant Limited are available to reduce development cost and time to market. Having been already ported to the MDS' Consumer Photo and Media Display platform, you can be up and running the latest media standards in days instead of months. For more information on complete platforms design with software please see the MDS web site.

## Software development

While off the shelf middleware and end-to-end software packages offer a very fast route to market, there are some companies that will want to harness the power of this platform with their own custom software.

Software for the pnx1500 series is compiled using NXP's' NDK tools and downloaded to the board via JTAG. Software is written using NXP innovative TSSA (TriMedia Streaming Software Architecture) architecture. By using this tool set and methodology complex media player applications can achieve a level of platform feature independence that is unmatched by any other media processor vendor.



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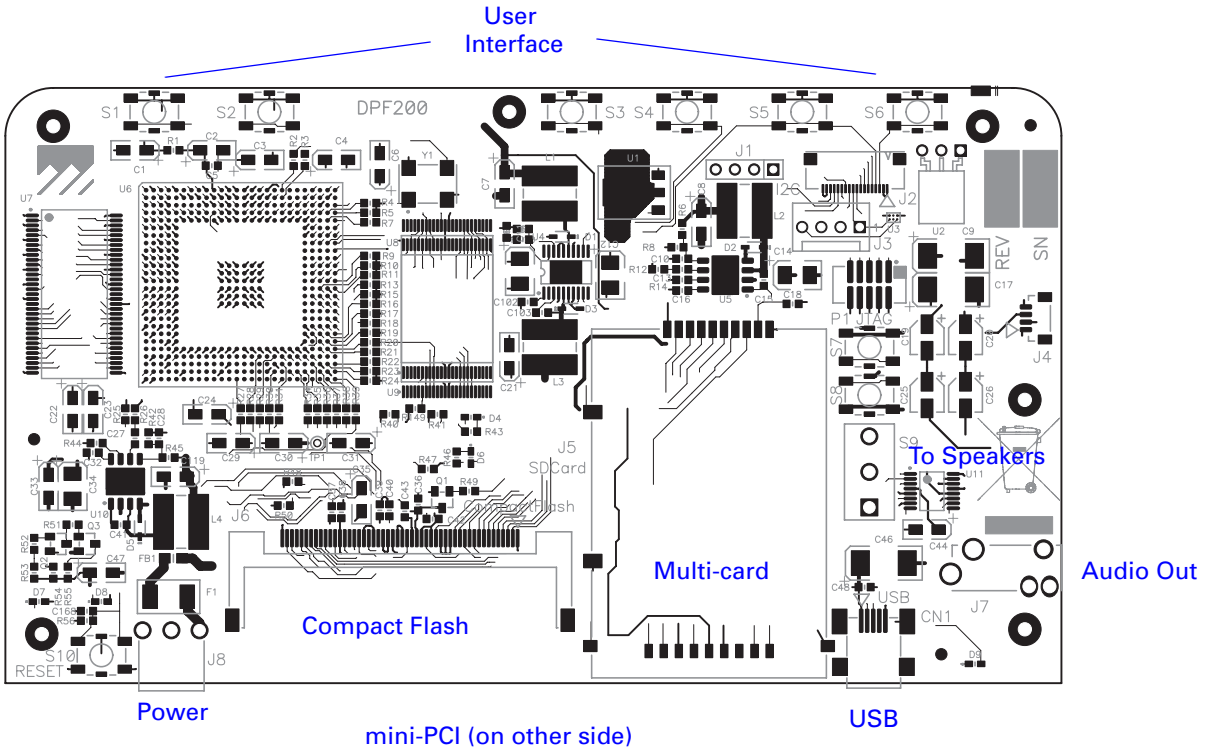


**Compact design offers a complete set of features**

## Reference design features

The reference design provides a high level of features so that derivative designs can easily be added. The following list summarizes the features and the options they provide.

- NAND flash - program and local internal storage
- MiniPCI 802.11 interface - allows remote fetching of content (3rd party software available for TCP/IP, uPnP, DLNA, and ViiV support)
- USB - provided mass storage interface (thumb drives).
- Audio out - local speakers or connect to external sound system
- LCD interface - supports parallel interfaces. Up to 1368x768 displays.
- User features.
  - light sensor to adjust display brightness
  - IR remote handling and/or buttons on unit
  - Universal flash card controller for all possible media types



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## Software

As all codec implementations on a pnx1500 are software based, products can be created that have a wide range of decode capability to avoid the need to transcode source files. The following libraries are optionally available for media playback or encoding.

Codecs

- Video decode: (up to D1 resolution, 30 frames/sec) MPEG-1, MPEG-2, MPEG-4 (SP,ASP), DivX-3/4/5,
- Video decode: (up to CIF resolution on pnx1500) WMV9, AVC/H.264
- Audio decode: MP2, MP3, Dolby Digital®,AAC,WMA9, Ogg Vorbis
- Image decode: JPEG (GIF, BMP, PNG via application level decoders)

Other Libraries

- Communications: TCP/IP

All are available from MDS, please see http://www.mds.com for more details. MDS also works with a wide range of Nexperia software development companies, if you need something not listed please contact us.

## Support that makes a difference

For over 8 years Momentum Data Systems has been offering cutting edge tools for developers of TriMedia/Nexperia applications. In addition to the Philips supplied compilation tools and examples, MDS creates additional examples and extensive documentation on how to get started using the tools.

For example, for the pnx1502, MDS has developed our "XA" development architecture which decouples your product software from needing to be changed with each Philips update, allowing you to develop faster and more efficiently. That environment is now a standard feature of the NDK.

## Reference package

In addition to demonstration units, MDS offers the unit with all hardware design information. Schematics are provided as both pdf and ORCAD schematic and layout source files. Gerbers, bill of materials.

Packages are available including the NDK-5 compiler and a MDS JTAG card so that the flash can be modified and/or new programs downloaded and executed.

To develop customized versions of the software to create an actual product, or to operate the software on a different hardware configuration, the NDK compiler tool is required along with libraries for video/audio codecs (i.e., MPEG2, 4, MP3, etc.) as well as the GUI (either a 3rd party or your own).

Companies undertaking their own software development should consider taking the TriMedia training classes, please see http://bores.com/ for the current schedule.



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# Consumer Photo & Media Display Reference Design

## Summary Specifications

For reference board as shipped from MDS.

### Processor & Memory

- 240 MHz pnx1500 32 MBytes DDR400 memory, 32 MBytes NAND flash. (see pnx1500 datasheet for more information on the processor)

### A/V Outputs

- Line level stereo audio
- Speakers
- LCD

### Front panel

- Ir Rx
- User Led
- Power button and user buttons

### Other connectivity

- TriMedia JTAG port
- MiniPCI populated with Atheros 802.11 a/b/g based card

### Miscellaneous

- External 12V supply with autosensing universal input.
- Main PCB: Approx. 5" (125mm) width, 3.2" (80mm) deep by 1" (25mm) high
- RoHS compliant design

## Ordering information

*DPF15-KIT*: Demonstration unit with display.

- pnx1500 based unit and universal input AC supply
- 5" 640x480 18 bit display with back light (subject to change)
- Preconfigured with Ant's PurePlay
- Other examples can be downloaded via JTAG (emulator not included)

### Suggested tools (available from MDS, see website for more information)

- NDK5 compiler/linker for pnx150x
- MDS PCI or USB JTAG for TriMedia

### Suggested libraries (available from MDS, see website for more information)

- NXP Decoders Library - MPEG2, MPEG4, and MP3 audio decoder
- NXP DivX Decoder, Dolby AC3, H.264 decoder
- NXP WMA/WMV
- Blunk Target TCP/IP stack
- Contact MDS for information about Ant software products, or see: http://www.antlimited.com/

**PCI or USB JTAG**: These MDS products were specifically designed for Nexperia developers and offers unmatched code download speed.

**PRELIMINARY - SUBJECT TO CHANGE**

DPF datasheet rev 1b 5-Jan 07

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