MOMENTUM DATA SYSTEMS

http://www.mds.com

Platform for deployment of Digital Media Adapters using Philips pnx1502 Nexperia processor

Networked Media Engine Platform

MDS' DMA (Digital Media Adapter) platform serves both as development platform for a full featured networked player as well as a fully capable media server.

MDS' DMA 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.

Unlike networked media clients with limited resolution, the DMA supports true 720x480/586 (NTSC/PAL) decode/display and capture/encode (MPEG2/4 encode).

The pnx1500 processor's built in deinterlacing and video scaling hardware provides true high quality display of standard definition content scaled to standard 720p or 1080i resolutions. The pnx1500's output processor provides picture quality enhancement.

Offering a complete set of audio and video I/O capability, the system includes flash for booting from as well as a hard drive for media storage. While not included in the demonstration unit, the mini-PCI expansion connector can be used to add user developed 802.11 capability.

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

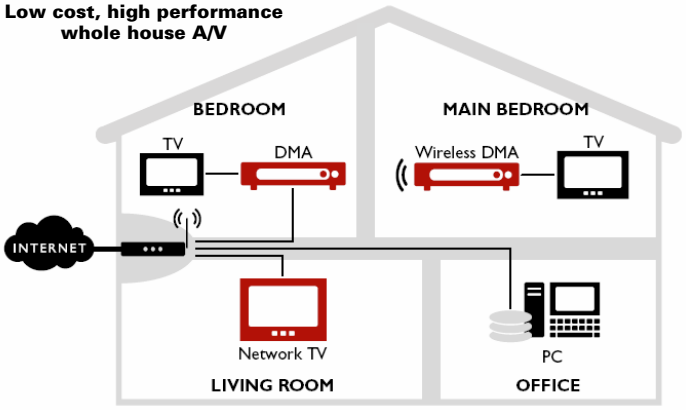
Off the shelf application software

Third party player environments from companies such as MediaBolic and Ant Limited are available to reduce the development cost and time to market. Having been already ported to the DMA platform, you can be up and running the latest media standards in days instead of months. For DVD playback, Mocean Labs offers a playback system. For more information on complete platforms designs with software please see the MDS web site.

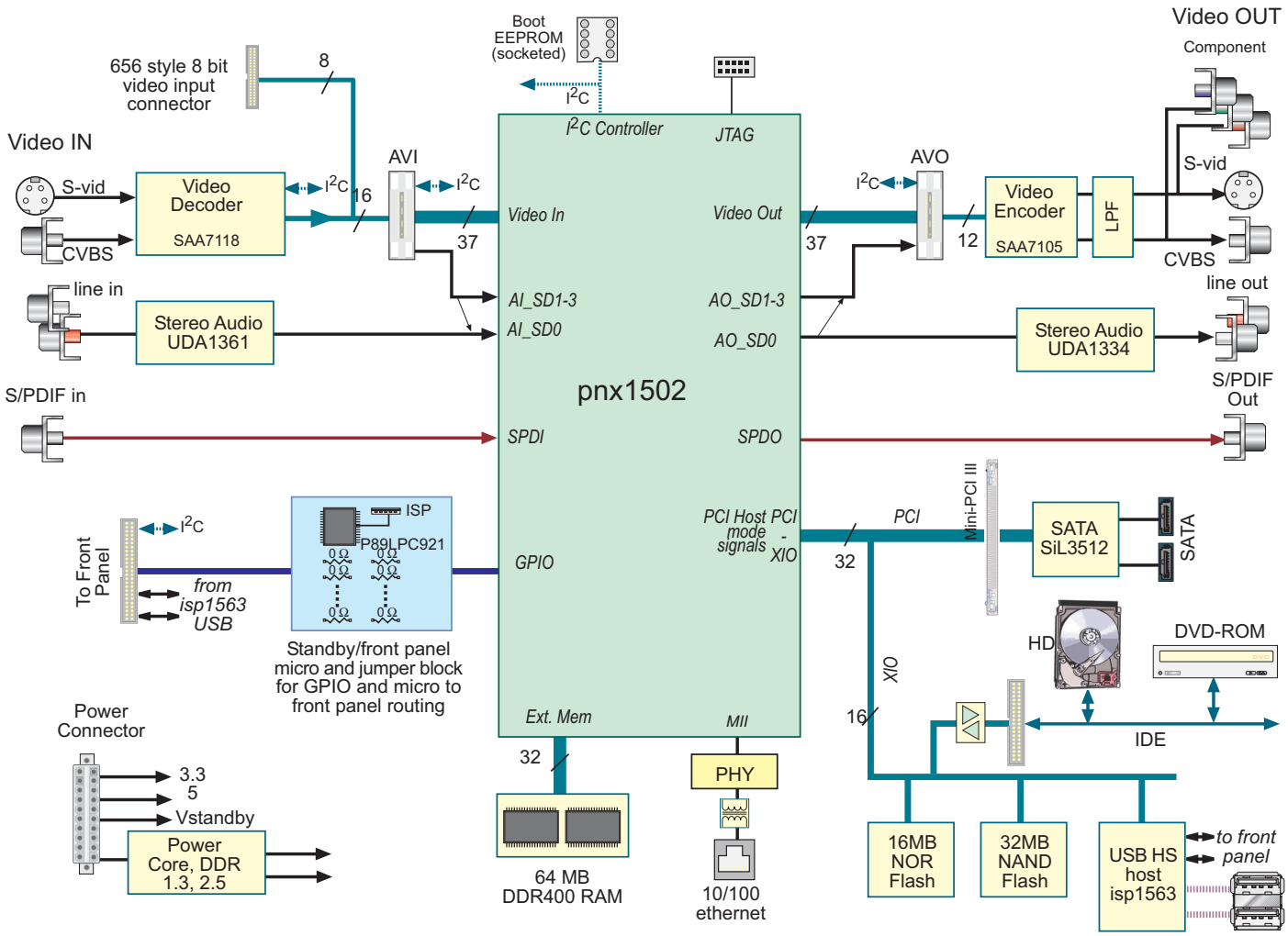
Software development

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.

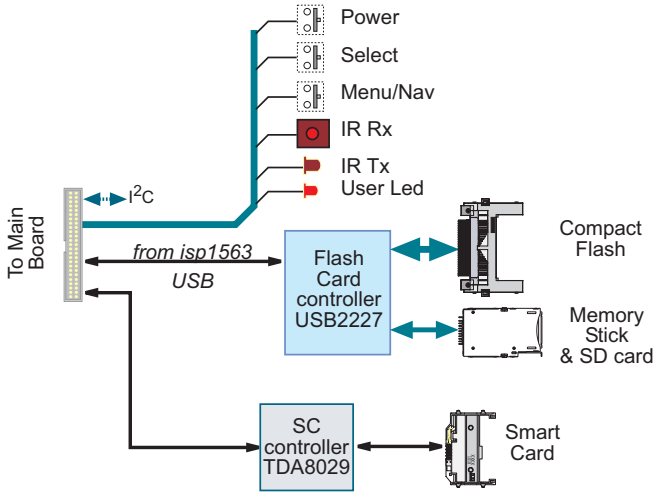
Software for the pnx1502 series is compiled using Philips' NDK tools and downloaded to the board via JTAG. Software is written using Philips innovative TSSA (TriMedia Streaming Software Architecture) architecture. By using this tool set and methodology complex video applications can achieve a level of platform feature independence that is unmatched by any other media processor vendor.



DMA Platform



The MDS DMA platform can act as a simple thin client or as a full featured server system.



Front panel interfaces

The MDS DMA design offers a wide range of hardware features to emulate everything from simple thin clients through full featured server designs. A separate PCB for the front panel offers a number of flash card interfaces as well as a smart card interface for applications that require authentication.

A flexible jumper arrangement allows a small 'standby' 8 bit microprocessor to manage the front panel or it can be bypassed to allow pnx1502 direct control of everything.

Internally there are impedance controlled expansion connectors for audio and video in and out. A standard IDC connector provides access to an 8 bit port than can be used to connect 656 style video or MPEG2 streams (for connection to a tuner or other external source).

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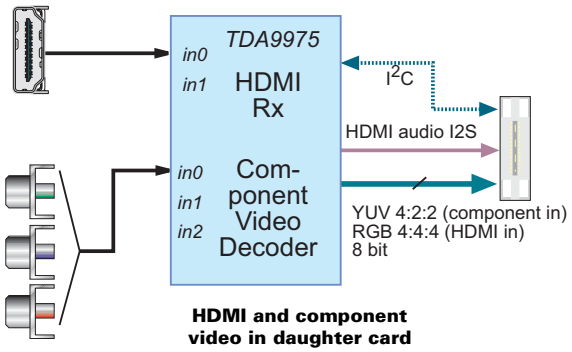
DMA Platform

Daughter cards

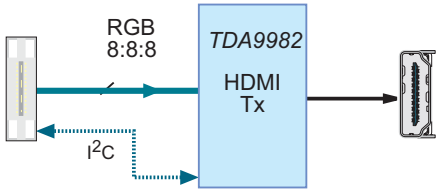
All DMA platforms include a DVI output daughter card. HDMI connections are now becoming commonplace on consumer video devices, and an optional HDMI input and output daughter cards can be ordered. As both include HDCP a HDCP license is required to take delivery.

The input daughter card also includes the ability for analog component video (YPbPr) input at resolutions up to 1920 x 1080i.

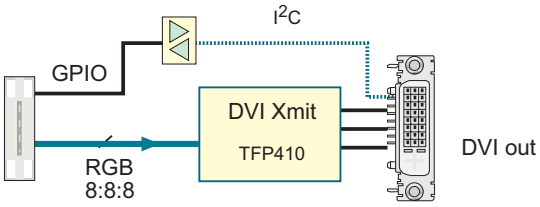
Please note that some video modes may be supported for demonstration purposes and additional software may be needed for production level drivers.



HDMI and component video in daughter card



HDMI out daughter card



DVI out daughter card

Also available is a daughter card that breaks out the high density connector to a .1" grid that can be used to attach other sources or sinks of video and audio data.

Easy to use platform

While retaining a consumer electronics appliance look on the outside, MDS' DMA platform offers easy access to internal connectors and the hard drive. However, with the JTAG connector on the back there's no need to always have the cover off.

The main processing card can be removed from the chassis and operated without the front panel and disk drives. For example this allows the main board to be located behind a LCD panel to create a prototype IP based TV set. The board requires just a 5V and 3.3V supply.

A mini-PCI slot is available for adding 802.11 capability. Please contact MDS for information about supported chip sets/drivers for wireless Ethernet applications.

Developer friendly access to internal components

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DMA Platform

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, WMV9
- Video decode: (up to CIF resolution, 30 frames/sec) AVC/H.264
- Video encode: (up to D1 resolution, 30 frames/sec) MPEG-2, MPEG-4 (SP)
- Video encode: (up to CIF resolution, 30 frames/sec) H.264 baseline
- Audio decode: MP2, MP3, Dolby Digital®,AAC,WMA9, Ogg Vorbis
- Audio encode: MPEG-1 L2, MP3, Ogg Vorbis
- Image decode: JPEG (GIF, BMP, PNG via application level decoders)

Other Libraries

- Communications: TCP/IP
- Storage: NOR or NAND flash file system

The NDK (Nexperia Development Kit) package includes libraries for both on chip and external video peripherals, IDE (FAT32), and USB mass storage class drivers.

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.

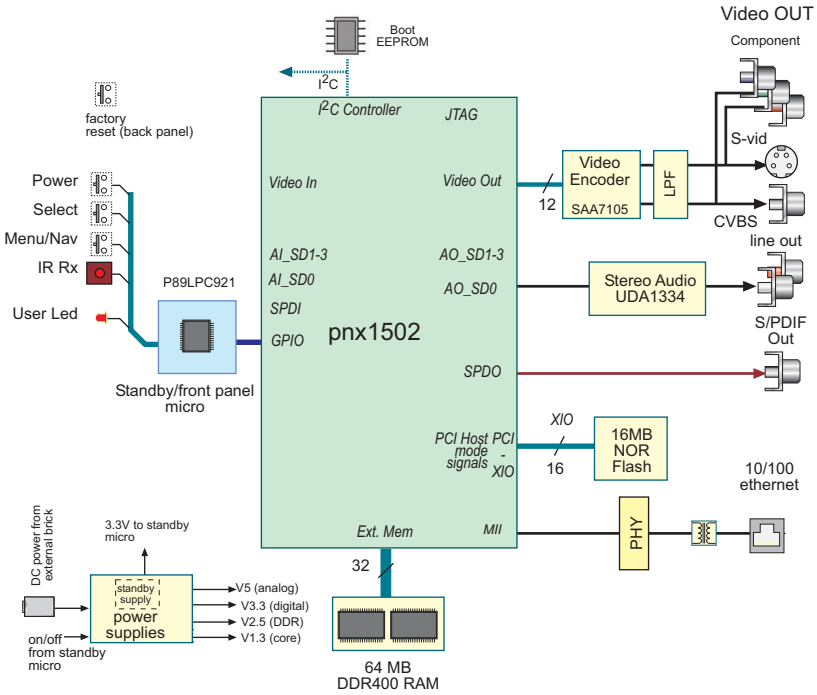
pnx170x generation

Philips has announced the pnx170x processor series, which is source code compatible with the pnx1500, as well as being pin compatible. The MDS DMA design supports use of pnx170x; DMA units and corresponding software libraries will be released 2Q06.

The pnx1702 offers improved speed over the pnx1500, allowing playback of ED (480p) MPEG2/4 content and D1 resolution h.264 content.

Thin client with less than US$ 50 PCB BOM

The MDS DMA platform is a superset of a wide range of networked media systems. The diagram below shows a typical subset for a thin (no local storage) client. Please see the MDS website for details of this reference design.



Reference package

In addition to DMA demonstration units, MDS offers the unit with all hardware design information. Schematics are provided as both pdf and Orcad source files. Gerbers, bill of materials, along with data sheets for all major components are provided.

Packages are available including the NDK-4 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).

MDS includes 10 hours of consulting assistance with our engineering staff to answer questions about the hardware design and/or software configuration. Extended consulting can also be purchased.

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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DMA Platform

Summary Specifications

Processor & Memory

- 300 MHz pnx1502, 64 MBytes DDR400 memory, 16 MBytes NOR flash, 32 MBytes NAND flash. (see pnx1500 datasheet for more information on the processor)

A/V Inputs

- Line level stereo audio
- SPDIF in
- CVBS (PAL/NTSC)
- S video

A/V Outputs

- Line level stereo audio
- SPDIF out
- CVBS (PAL/NTSC)
- S Video
- DVI/component video, 480i, 480p, 720p, 1080i modes
  DVI output daughter card included supports same modes
  pnx1500 hardware supports deinterlacing, scaling, and picture quality improvement

Front panel

- Ir Tx and Rx
- User Led
- Secure Digital/Memory Stick card slot
- Compact Flash card slot
- Smart Card slot

Other storage/connectivity

- 40 GB IDE drive
- IDE CD/DVD ROM drive
- TriMedia JTAG port
- 2 USB host ports
- 10/100 Ethernet

Miscellaneous

- Universal autoranging power supply. Standard Flex-ATX style.
- Chassis size: Standard 17" (417mm) width. Apporx 15" (370mm) deep by 2" (50mm) high

Options

- Component and HDMI in daughter card
- HDMI out daughter card
- Prototyping daughter card

Ordering information

DMA15-KIT: DMA demonstration unit.

- DMA unit with cables (A/V in, A/V out, component video out, remote, and AC line cord).
- Includes DVI output daughter card.
- Preconfigured with MediaBolic's client software or Ant's PurePlay
- Other examples can be downloaded via JTAG (emulator not included)

DMA15-DESF: DMA design transfer fee.

- Schematics (pdf and Orcad) and layout files (PCAD 2002), BOM, gerbers
- 10 hours of engineering support

DMA-EXP: HDMI in and out daughter cards

- Component input and HDMI with HDCP input
- HDMI with HDCP output
- Must by HDCP licensee to order

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DMA-PROTO: AV expansion connector to .1" grid

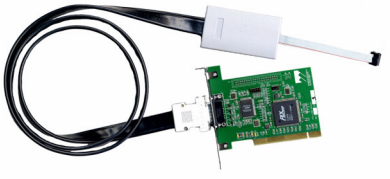
- Provides access to all audio and video signals
- I2C 8 bit port expander

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

- NDK4 compiler/linker for pnx150x
- MDS PCI or USB JTAG for TriMedia

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

- Philips Decoders Library - MPEG2, MPEG4, and MP3 audio decoder
- Philips DivX Decoder, MP3 encoder, Dolby AC3, H.264 decoder
- WMA/WMV
- Target TCP/IP stack
- MPEG2 encoder and MPEG4 encoder (D1 resolution)
- Contact MDS for information about related software products, or see:
  http://www.antlimited.com/
  http://www.mediabolic.com/
- http://www.mocean-labs.com/



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

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