MULTIMEDIA

MICRONAS

APB 7202A nGene®

Jan/2005

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Dual-Channel PCI Express™ Multimedia Controller

The advanced PCI Express multimedia controller APB 7202A features dual-channel video/audio and transport stream capture capabilities, as well as audio output functions. The APB 7202A combines flexible buffer management with the benefits of the PCI Express point-to-point protocol to form a key component for creating the next generation of PC-based personal video recording devices for high definition, as well as analog video and audio content.

The IC provides an extensive set of features and functional integration, which include two transport stream interfaces, two ITU 656 video interfaces, I^2S and S/PDIF audio input and output interfaces.

Features

- Two transport stream inputs for DTV including HD formats (ATSC, DVB-T)
- Interlaced and progressive analog video streaming support (480/525 i/p)
- ITU 601 HD input support up to 1080i
- VBI sliced and raw data streaming support
- Multi-channel compressed and uncompressed audio streaming
- Serial EEPROM support for IDs and firmware, field upgradeable
- Complete set of DirectShow® compatible WDM and BDA drivers which supports consumer PVR applications such as
  - ShowShifter™,
  - Microsoft Media Center®,
  - InterVideo Home Theater™,
  - and CyberLink PowerCinema™.
- Glueless interfacing to Micronas' video decoders and DVB-T/ATSC demodulators

Interfaces and Functions

- 2×10/8 bit ITU 656 interfaces
- 2 parallel or serial transport stream interfaces
- Multi-channel capable I^2S audio I/O interfaces
- 2 S/PDIF input interfaces
- 1 S/PDIF output interface
- UART, JTAG
- I^2C master/slave interface
- Embedded microcontroller for flexible resource management
- x1 PCI Express core with all power management features
- 1.5 V core supply, 3.3 V I/O
- Hardware support for
  - Time stamping
  - A/V synchronization
- Scatter gather DMA operation

Applications

- Dual stream hybrid (analog and/or digital) audio and video capture, playback, PVR, and time-shift applications with high picture quality, low latency and high throughput capabilities.
  - Picture-in-picture (PIP) support
  - Watch and record
  - Watch one stream while recording another
  - Watch and record two streams
  - Pause, fast forward, rewind live TV
  - Simultaneous interfacing to STB/ analog cable and ATSC
  - FM radio
  - Support of various analog or digital audio and video inputs (DVD, VCR, camcorder)

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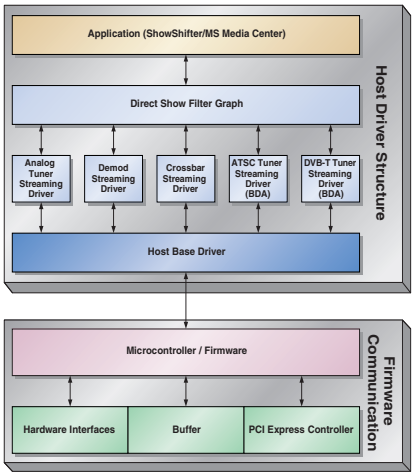

Fig. 1: Software architecture

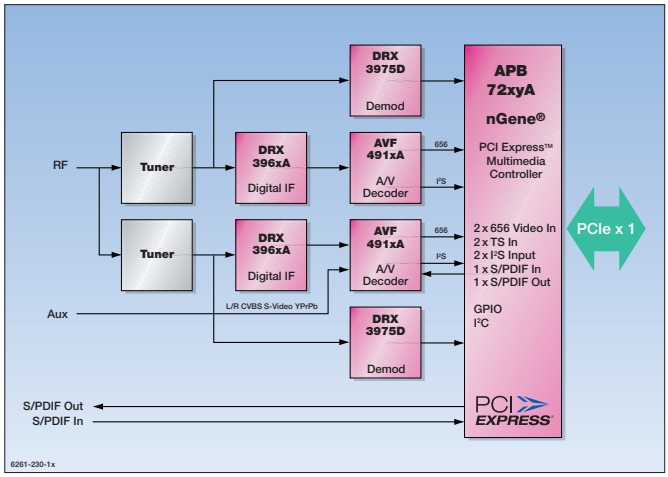

Fig. 2: Dual-channel TV tuner with PCI Express™

System Architecture and Software

The embedded microcontroller manages the peripheral interfaces, interrupts, and the bandwidth allocation on the PCI Express interface, as well as the host communication. I/O interfaces autonomously stream through an internal buffer allowing flexible handling of bandwidth and latencies.

A complete set of WDM and BDA drivers for integration into any Microsoft DirectShow filter graph is available. The layered driver concept comprises:

- **Downloadable firmware** for the microcontroller allows flexibility in hardware resource allocation.
- **The host base driver** implements the hardware communication, as well as buffer and interrupt management. The base driver provides an internal API to communicate with the upper level drivers.
- **Streaming drivers** interface to the base driver to pass communication requests to the hardware. They appear as filter blocks in a DirectShow Filter Graph. The filters include: tuner (analog and digital), capture (audio, video, VBI, transport stream), and crossbar.

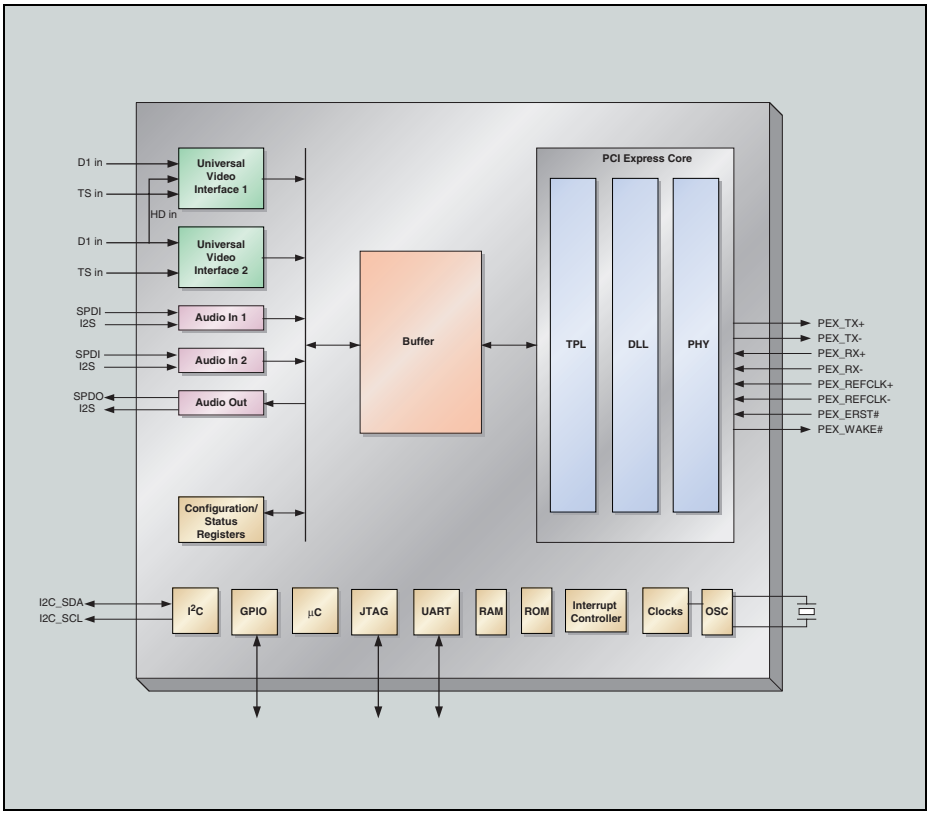

Fig. 3: Block diagram of the APB 7202A

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