PRELIMINARY PRODUCT LETTER

NEC

MOS INTEGRATED CIRCUIT

μPD61171

SECOND GENERATION ENHANCED MULTIMEDIA ARCHITECTURE PROCESSOR FOR DVD RECORDER/PERSONAL VIDEO RECORDERS

DESCRIPTION

The μPD61171 is a fully-integrated system processor for DVD recorders or personal video recorders (PVR). Based on NEC Electronics' second-generation Enhanced Multi Media Architecture (EMMArchitecture), the μPD61171 provides the functionality required to realize a high-performance and cost-effective DVD recorder or PVR.

FEATURES

- DVD-Video, DVD-Video Recording compliant
- DVB, MPEG2-TS/PS and MPEG1 compliant codec
- Dolby™ digital audio codec, DTS™ audio decoder
- High performance, dual MIPS32™ CPU core: 225 MIPS at 187 MHz
- High-bandwidth unified memory controller to support external DDR SDRAM
- Flexible multi-standard, multi-stream processor
- Integrated CSS and CPPM decryption
- Integrated CPRM and DES encryption/decryption
- Integrated Multi-2 and DVB descrambler
- Dual storage interfaces for ATA UDMA100-compliant HDD and ATAPI DVD drive
- Real time VBR/CBR encoding
- 3D noise reduction filter and motion-adaptive de-interlacer
- 7 graphics planes with dual video scalars
- Simultaneous progressive and interlace video outputs: 6 DACs for YPbPr (or YCbCr or RGB), S-Video (Y/C) and CVBS output with support for NTSC, PAL and SECAM
- Multi-channel audio outputs: IEC60958 and PCM with support for up to 8 channels
- Selectable host bus interface: Generic 16-bit host bus or PCI bus

APPLICATIONS

DVD recorders, personal video recorders, home servers

ORDERING INFORMATION

Part number	Package	Remark
μPD61171F1-XYZ-MN2-A	449-pin plastic BGA (27 × 27)	XYZ: Audio option

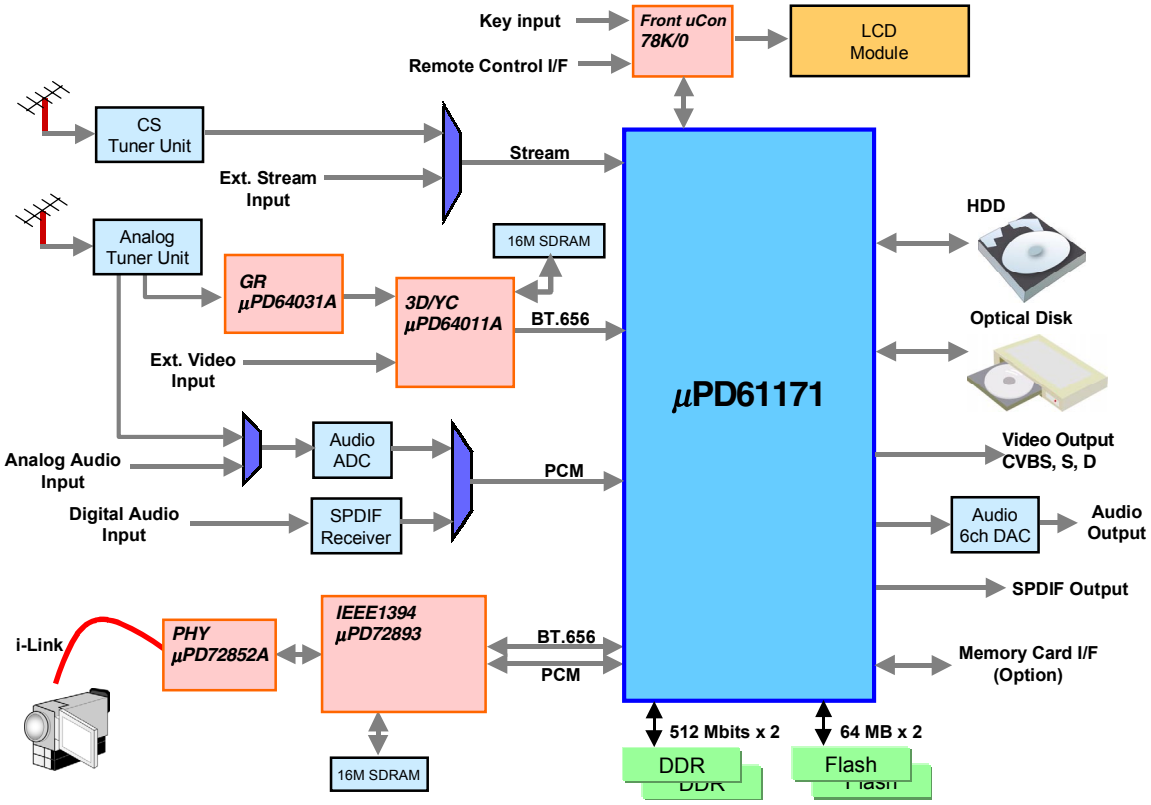
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TYPICAL APPLICATION



FEATURE LIST

High-performance main processor:

- High-performance MIPS32 CPU core: 225 Dhrystone MIPS @187 MHz frequency
- 32-bit RISC MIPS architecture
- Supports MIPS32 instruction set
- 8 KB instruction cache, 8 KB data cache configuration
- EJTAG debugging interface

High-performance sub CPU:

- High-performance MIPS32 CPU core with DSP features for media processing
- 8 KB instruction cache, 8 KB data cache configuration
- 48 KB scratch-pad memory support

Unified memory controller:

- Supports 32-bit bus width DDR SDRAM
- Supports data rate up to PC266
- Unified CPU / MPEG Codec / Graphics memory
- Supports 128 M bits, 256 M bits, 512 M bits DDR SDRAM device
- Total memory size up to 1 G bits

External memory interface (EMI):

- ROM interface
  - Total address area 64 MB/CS for ROM
  - Supports normal, page and flash ROM
  - Supports NOR, NAND and strata flash ROM
  - 2 chip select signals for ROM
- General input/output (GIO) interface
  - Total address area 16 MB for GIO
  - 4 chip select signals for GIO
  - Supports Intel, Motorola, and 16-bit PC card (PCMCIA) interfaces

MPEG video encode engine:

- MPEG2 video MP@ML, SP@ML standard and MPEG1 standard
- Single-pass VBR, CBR encode control
- Supports various picture sizes
  - Horizontal: 720, 704, 640, 544, 480, 352, 320 pixels/line
  - Vertical: 480, 240, 576, 288 lines/frame
  - Pre-analysis: Film detection, scene change detection and motion estimation assist
- Supports video
  - 8-bit Y/Cb/Cr 4:2:2 (ITU-R BT.656)
- Time base corrector
- Embedded 32-bit RISC encode control processor

Audio encode engine:

- MPEG1 audio layer 2 standard
- LPCM for DVD/D-VHS
- Supports sample rate conversion
- Dolby Digital consumer encode (family option)

MPEG stream processor:

- MPEG2-PS, MPEG2-TS and MPEG1-System demultiplexing
- Supports DVD-Video, DVD-Video recording and VCD
- Integrated CSS and CPPM decryption
- Integrated CPRM and DES for encryption / decryption
- Integrated Multi-2 and DVB descrambler
- Multiplex support for format conversion
- Demultiplex support
- Partial TS generation
- Stream interfaces
  - Two 8-bit parallel ports
  - Two serial ports

MPEG video decode engine:

- MPEG2 video MP@ML, SP@ML standard and MPEG1 standard
- Supports double decode capability for trick play
- JPEG decode accelerator

Audio decode engine:

- MPEG1 audio layer 1/2 standard
- LPCM for DVD/D-VHS
- Dolby Digital 5.1 channel decode (family option)
- DTS (family option)
- MP3 (family option)
- WMA (family option)
- Supports virtual surround
- Supports mixing of test tone, attenuation

Display/graphics BitBlt engine:

- 7 graphics planes
- 256-level alpha blending between all planes
- Simultaneous interlace and progressive video output
- Motion adaptive 3D-NR and motion adaptive De-interlacer
- Clipping functions for OSD
- Color space and color depth conversion function
- Two independent real-time scalars plus offline scalers for both OSD planes
- Sub-picture decoding and scaling functions

Video encoder:

- Six 54 MHz 10-bit DACs for analog YPbPr (or YCbCr or RGB), S-Video (Y/C) and CVBS video output.
- NTSC, PAL and SECAM standards
- Support for L21 data, Teletext, WSS, VBID, and VPS

External audio/video port:

1 video/stereo audio input port for MPEG2 audio/video encode engine
1 video/stereo audio I/O port for external DV codec device
1 video output port for external video encoder device
Multi-channel output port for audio DAC device
IEC60958 output port
Supported video formats:
ITU-R BT.656
ITU-R BT.1358

PCI interface:

3.3 V 33 MHz 32-bit PCI 2.2
Initiator/Target
2 target windows
Boot across PCI

IDE interface:

Supports two IDE interfaces for up to four IDE drives
UATA100/66/33, bus master IDE and PIO modes
2 IDE I/F Supports

Peripherals:

Supports one MultiMediaCard™/Secure Digital Memory Card interface
Supports one Memory Stick™ interface
Two 16550 UARTs with 16-byte FIFOs
Two asynchronous UARTs
Supports one clocked serial interface (CSI)
Two ISO-7816-compliant SmartCard interfaces
Two I^2C-compatible multi-master interfaces
General purpose I/O
Four timers supporting input capture/output compare
Two system timers, an elapse timer, a (volatile) real-time clock and a watch-dog timer

Physical:

Power :	2.5 W (TYP)
Power supply voltage :	3.3 V I/O
	2.5 V I/O for DDR SDRAM interface
	1.5 V for core logic

Package:

449-pin Plastic BGA (27 × 27 mm)

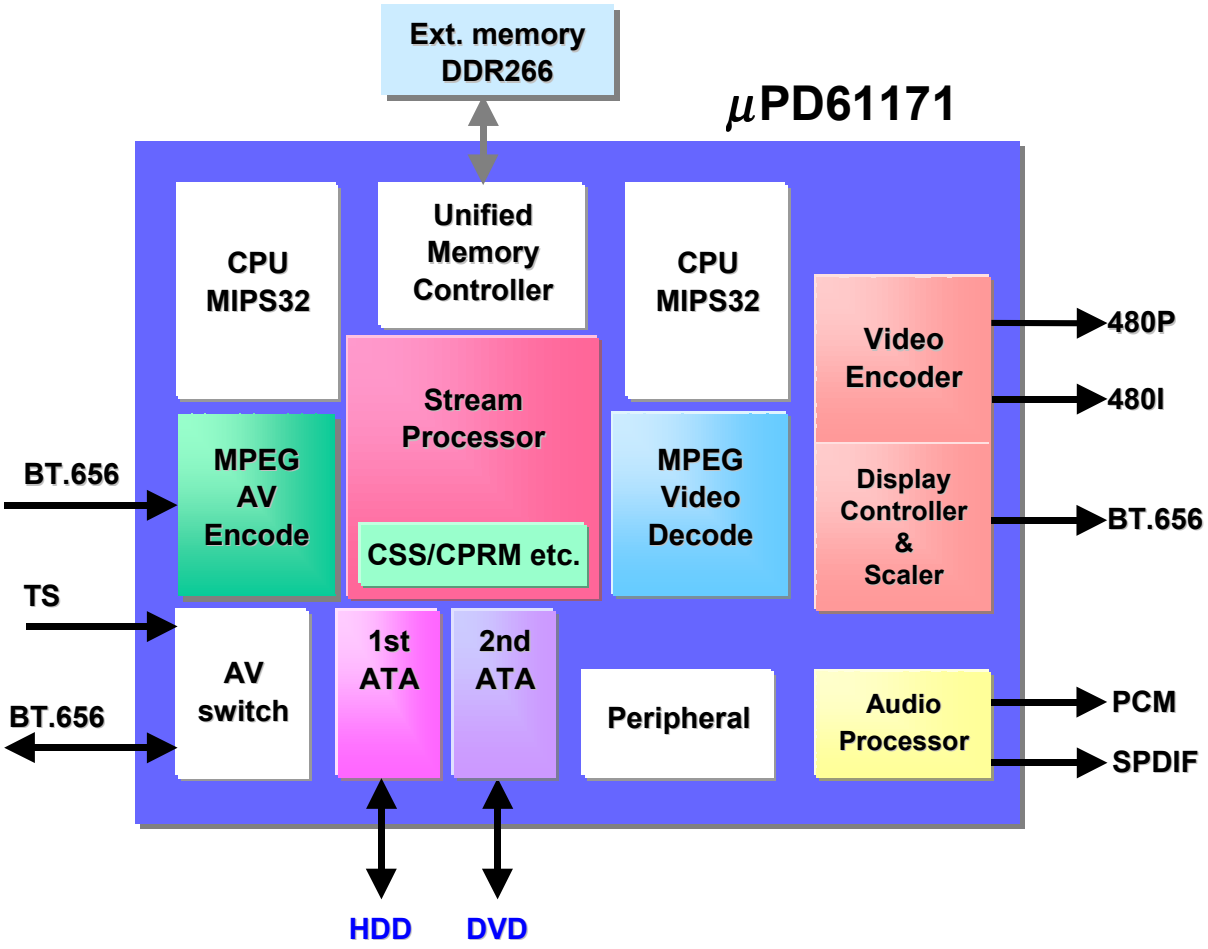
1. FUNCTIONAL DESCRIPTION

1.1 Overview

The functionality of the device can be divided into the following areas:

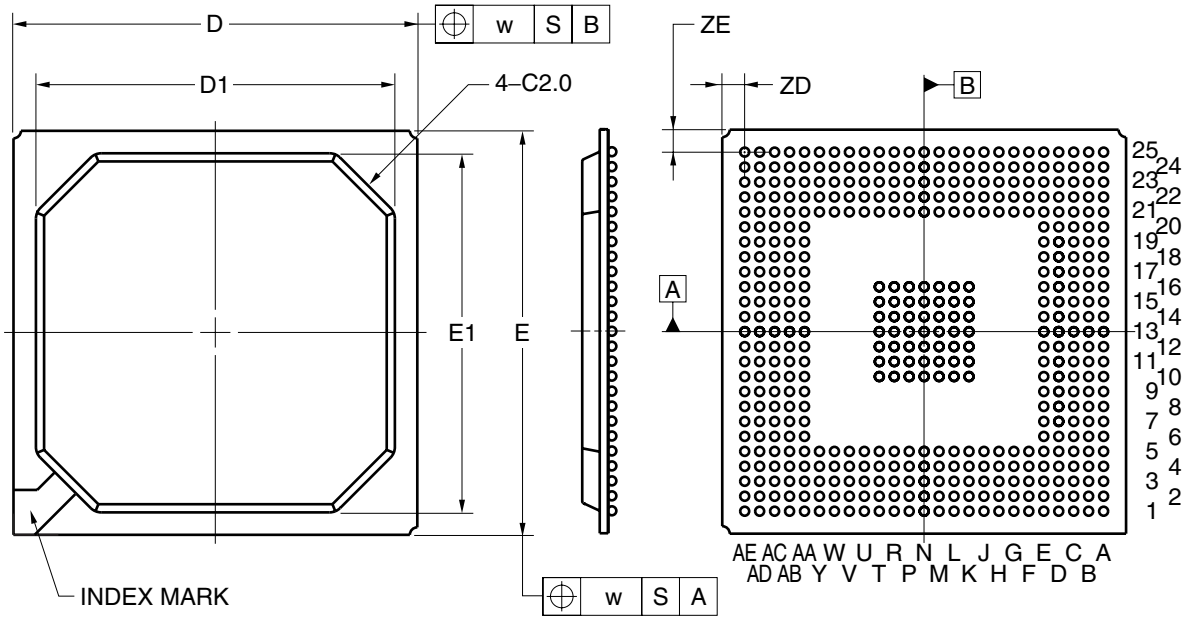
- CPU core
- MPEG AV encoder
- MPEG stream processor
- MPEG video decoder
- MPEG audio decoder/processor
- External A/V input/output
- Graphics processor
- Video encoder
- Miscellaneous interfaces

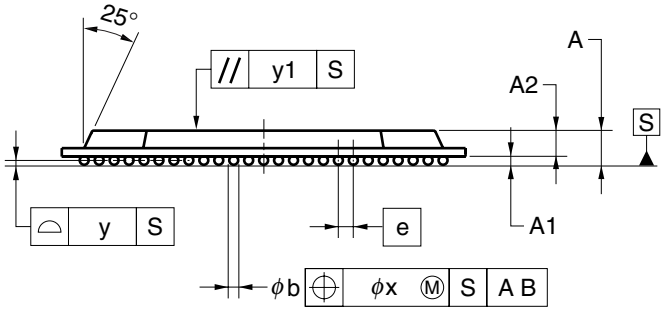
1.2 Block Diagram



2. PACKAGE DRAWING

449-PIN PLASTIC BGA (27x27)





ITEM	MILLIMETERS
D	27.00±0.20
D1	24.00
E	27.00±0.20
E1	24.00
w	0.30
e	1.00
A	2.23±0.30
A1	0.50±0.10
A2	1.73
b	0.60±0.10
x	0.15
y	0.15
y1	0.35
ZD	1.50
ZE	1.50

P449F1-100-MN2-1

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MultiMediaCard is a trademark of Infineon Technologies AG of Germany.

Memory Stick is a trademark of Sony corporation.

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