

LSI Logic DiMeNtion™ 8602

DVD Recorder System Processor

DiMeNtion-2™

OVERVIEW

The LSI Logic DiMeNtion-2 second-generation family of DVD recorder processor products is based on the proven DoMiNo™ architecture. The DiMeNtion-2 family is intended for demanding, yet cost-sensitive, A/V codec applications that allow consumer electronics manufacturers to offer a broad range of DVD recorder and other consumer electronics products. A true system-on-a-chip solution, the DiMeNtion 8602 (DMN-8602) reduces cost, design complexity, power consumption and time-to-market, and offers broadest feature set with the best image quality.

The DMN-8602 accepts video from broadcast TV and other analog video sources and compresses and formats the video for storage on DVD in industry-standard recordable formats. The DMN-8602 supports the simultaneous playback of previously recorded video from DVD, which may be from the same broadcast program, time-shifted. To support archiving digital camcorder content to a DVD, DMN-8602 integrates a second generation DV codec. The LSI Logic Direct Digital Dub™ technology simplifies the transfer of personal digital content from a cam-corder to DVD over FireWire, with one-touch control via a single remote.

The DMN-8602 offers DoMiNoFX™ technologies – industry-leading pre- and post-processing of video – to create a visibly superior viewing experience. LSI Logic's proprietary motion-compensated temporal filtering (MCTF) algorithm, TrueView™ Pro, provides a cleaner picture through substantial noise reduction. This technique is coupled with the LSI Logic fifth-generation compression technology, PerfectView® Pro for excellent video quality, even at very low bit rates. The motion-compensated de-interlacing (MCDI) TrueScan™ Pro then recreates clear images on progressive scan displays through the elimination of video blurring in moving scenes.

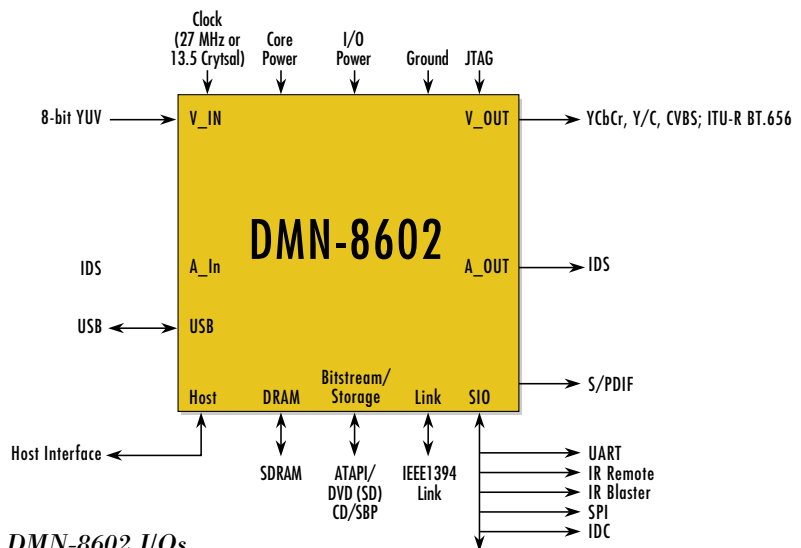


Figure 1: DMN-8602 I/Os



SYSTEM FEATURES

- Record broadcast TV to DVD with timeshift capability
- Store analog video on DVD
- Playback MPEG-4 video
- DVD playback
- Output video in progressive mode
- Connect to digital still cameras and memory cards via the USB port
- DoMiNoFX™ technologies for the highest-quality video
- Archive DV camcorder content on DVD with single remote control operation (Direct Digital Dub™)



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DEVICE FEATURES

- Dual 150 MIPS RISC architecture with integrated audio DSP
- Flexible video DSP and motion estimation processors
- Integrated TV encoder and video DACs
- High-performance memory controller for support of up to 256 MB of external SDRAM
- Second-generation DV codec
- IEEE1394 link layer with 5C content protection and AV/C protocol support
- Integrated USB controller
- 2D graphics engine (native 24-bit RGB with 8-bit alpha) with DVD sub-picture decode
- Serial I/O interface controller for infrared port, general-purpose serial I/O, etc.
- Storage device interface controller for IDE/ATAPI devices

CAPABILITIES

For DVD video recording applications, the DMN-8602 supports video compression in compliance with the MPEG-1, MPEG-2, and DV-25 specifications, and video decompression in compliance with the MPEG-1, MPEG-2, DV-25, and MPEG-4 specifications. The DMN-8602 also enables transcoding between DV-25 and MPEG-2. The product supports corresponding audio compression and decompression in compliance with the Dolby Digital CE and MPEG-1 layer 2 specifications.

The DMN-8602 supports the DVD-RAM, DVD-RW/-R, and DVD+RW/+R video recording formats and complete DVD recordable drive buffer management. The DMN-8602 can support either half-duplex (separate recording or playback) or full-duplex (simultaneous recording and playback) operations on the DVD recordable drive.

For playback applications, the product supports the playback of DVD-Video disks with Dolby Digital 5.1, MPEG-1 layer 2 and DTS audio encoding, and VCD and SVCD disks. For audio playback applications, the product supports the decoding of DVD-Audio disks (MLP), Windows Media Audio (WMA) and CD-DA formats. The DMN-8602 also performs all audio post-processing tasks such as 3D audio effects (Phantom™ Surround) and bass management functions.

SYSTEM DESIGN

The high level of integration drastically reduces system component count, and consequently system cost. Figure 2 shows a block diagram of an advanced DVD recorder based on DMN-8602.

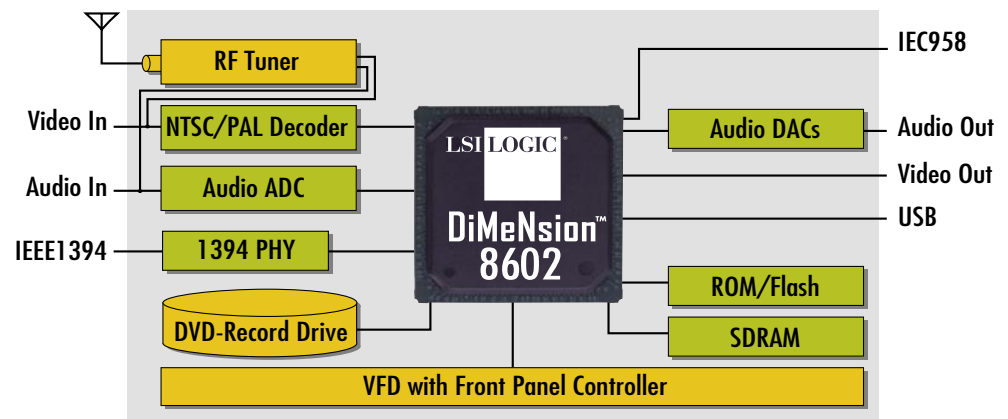



Figure 2: DMN-8602 DVD Recorder System




In addition to including a CPU, graphics engine, and complete audio and video systems, the DMN-8602 integrates an NTSC/PAL TV encoder, a second-generation DV codec, a Unified Memory Architecture and a USB controller. The USB controller allows for connectivity with flash memory cards and digital still cameras. This high level of integration makes DMN-8602 one of the most comprehensive and cost-competitive DVD recordable solutions in the market today.

ARCHITECTURE

The DoMiNo architecture – the foundation of the DMN-8602 product features – represents the optimal balance between hardware and software. Repetitively executed, computationally complex pixel processing tasks are accelerated in hardware execution units. Higher-level data processing is performed on standard RISC processors, permitting substantial product flexibility and use of industry-standard development tools.

The DMN-8602 is compatible with the LSI Logic C-Ware™ architecture, which provides a standardized API that is reusable across LSI Logic DoMiNo-based consumer digital video products, fully preserving software investment. C-Ware is integrated with the Wind River Systems® VxWorks RTOS and is supported by an industry-leading software development tool-chain.



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Summary of Specifications

Video Interface

Input	One 8-bit YUV 4:2:0 video stream
Output	Digital: One 8-bit ITU-R BT.656 interlaced video output Analog: Support for (M) NTSC, (B,D,G,H,I) PAL, CVBS, Y/C, analog component video RGB or SMPTE YCbCr outputs

Audio Interface

Inputs	2 channels, IDS compatible, 16-24 bits/sample
Outputs	8 channels, IDS compatible, 16-24 bits/sample, S/PDIF

I/O

Low Speed Serial	UART, SPI, IR, IR Blaster, IDC
Storage	IDE interface for ATAPI devices
High Speed Serial	IEEE 1394 Compliant, USB

Processing

A/V Codec	Single-stream, full-duplex, audio and video codec
Encode Formats	MPEG-2 MP@ML, MPEG-1, DV-25, DDCE
Decode Formats	MPEG-2 MP@ML, MPEG-1, MPEG-4, DV-25, AC-3, DDCE, MLP, AAC, DTS, WMA
Logical Disk Formats	DVD-VR (DVD-RAM, DVD-RW), DVD-V (DVD-R, DVD-RW), DVD+VR (DVD+RW, DVD+R)
Encryption/Decryption	CPPM, CPRM, CSS, 5C

System

Host	Internal host with 16-bit generic external bus interface
Graphics	2D OSD - up to 24 bit/pixel RGB with 8-bit alpha channel - with flicker filter, video scaler

Memory

Memory	Up to 256 MB of SDRAM
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Physical

System Clock	13.5 or 27 MHz
Operating	Power <2.7 W
Package	308 BGA

JTAG

Compliance	IEEE 1149.1 compliant boundary scan and PCB assembly testing
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