# LSI Logic DiMeNsion™ 8602
## DVD Recorder System Processor

# DiMeNsion™-2

## OVERVIEW

The LSI Logic DiMeNsion-2 second-generation family of DVD recorder processor products is based on the proven DoMiNo™ architecture. The DiMeNsion-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 DiMeNsion 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.

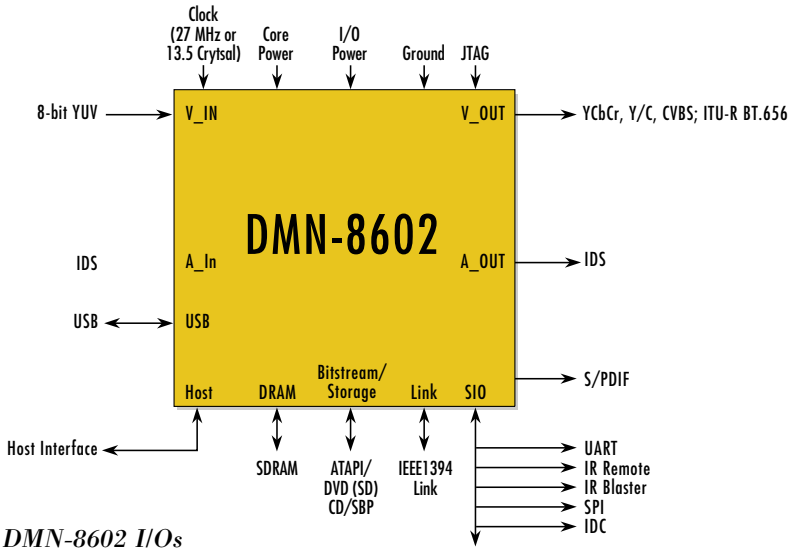



*Figure 1: DMN-8602 I/Os*




## 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 play- back 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.

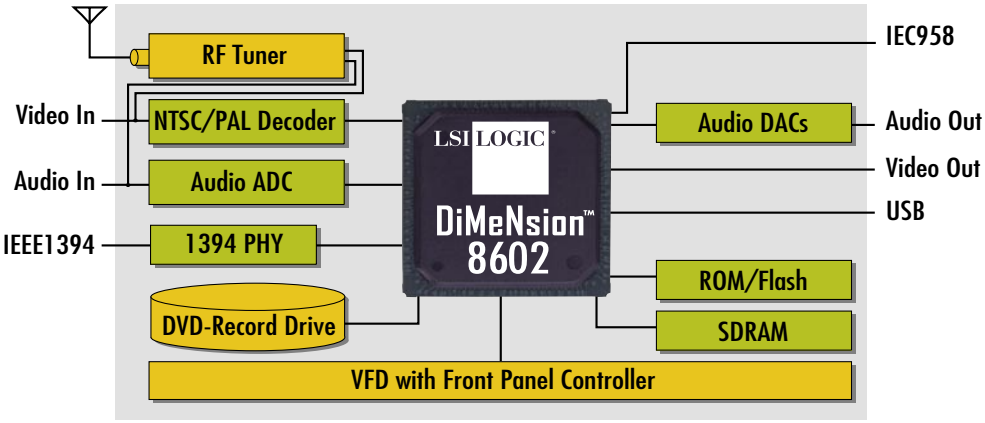



*Figure 2: DMN-8602 DVD Recorder System*

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, per-mitting 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 inte-grated 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<br>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 |
| **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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