

LSI Logic DiMeNtion™ 8652

HDD/DVD Recorder Processor

DiMeNtion-2

OVERVIEW

The DiMeNtion-2 is the second generation family of DVD recorder processor products based on the DoMiNo™ architecture. The DiMeNtion-2 is intended for demanding, yet cost-sensitive, A/V codec applications in consumer electronics products. A true system-on-a-chip solution, the DiMeNtion-8652 (DMN-8652) empowers dual-drive products while reducing cost, design complexity, power consumption and time-to-market.

The DMN-8652 enables consumer electronics manufacturers to offer a category of products that leverages the flexibility provided by the combination of hard disk and optical disk drives. The DMN-8652 accepts video from broadcast TV and other analog video sources and compresses and formats the video for storage on hard disk, or on DVD discs in industry-standard recordable formats (DVD-RAM, DVD-RW/R, DVD+RW/R). It permits control of DV camcorders connected via FireWire® using the AV/C protocol, and transcodes DV-25 video for storage on hard disk or DVD. The DMN-8652 supports simultaneous play back of video from hard disk or DVD, and a range of background copying operations (including dubbing and transrating) between the hard disk and optical drives.

The DMN-8652 offers DoMiNoFX™ technologies – industry-leading pre- and post-processing of video to create a visibly superior viewing experience. LSI Logic’s proprietary TrueView™ Pro motion-compensated temporal filtering (MCTF) algorithm provides a cleaner picture through substantial noise reduction. This technique is coupled with the LSI Logic fifth-generation PerfectView® Pro compression technology for excellent video quality, even at very low bit rates. The LSI Logic TrueScan™ Pro motion-compensated de-interlacing (MCDI) then recreates clear images on progressive scan displays through the elimination of video blurring in moving scenes.

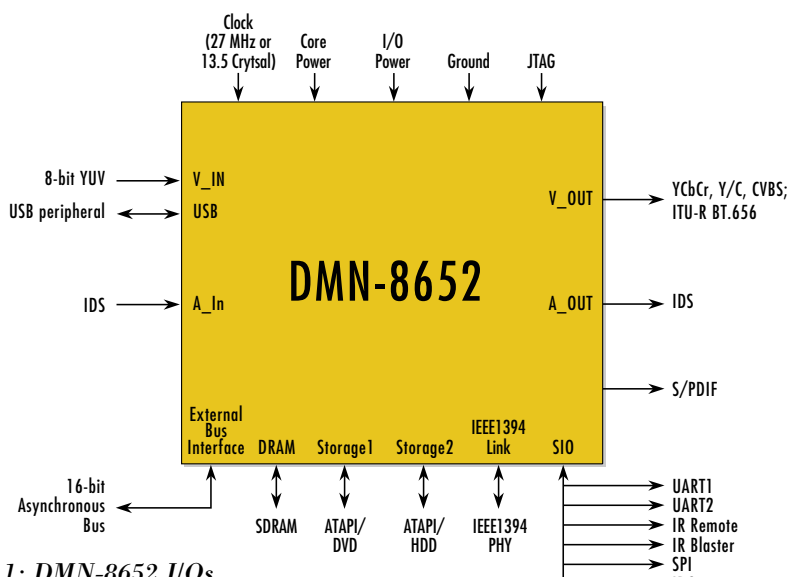


Figure 1: DMN-8652 I/Os



SYSTEM FEATURES

- Concurrent timeshifting and video archiving onto DVD
- High-speed video archiving onto DVD with bit-rate adjustment
- USB connectivity
- Record broadcast TV to DVD with timeshift capability
- Store analog video on DVD
- Playback MPEG-4 video
- Archive DV camcorder content on DVD with single remote control operation (Direct Digital Dub™)
- DVD playback
- Output video in progressive mode
- DoMiNoFX™ technologies for the highest-quality video



LSI Logic DiMeNtion™ 8652 HDD/DVD Recorder Processor

DEVICE FEATURES

- Dual 150 MIPS RISC architecture with integrated audio DSP
- Flexible video DSP and motion estimation processors
- Integrated TV encoder and video DACs
- 2 storage device interface controllers for IDE/ATAPI devices
- High-performance memory controller for support of up to 256 MB of external SDR/DDR SDRAM
- Integrated USB controller
- Second generation DV codec
- IEEE1394 link layer with 5C content protection and AV/C protocol support
- 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.

CAPABILITIES

For HDD and 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. It also transcodes 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. For audio recording applications, the DMN-8652 supports transcoding between CD-DA or WMA audio formats.

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.

The DMN-8652 is capable of a high degree of concurrency. Examples of this are DVD playback with background record to hard disk; time-shift (simultaneous record and delayed play back of the same program) on hard disk; DV camcorder to DVD archive with simultaneous display; copy a program from hard disk to DVD with background record of another program to hard disk; and archive from hard disk to DVD at high compression.

SYSTEM DESIGN

The high level of integration of the DMN-8652 drastically reduces system component count, and consequently system cost. Figure 2 shows a block diagram of an advanced HDD/DVD recorder based on DMN-8652.

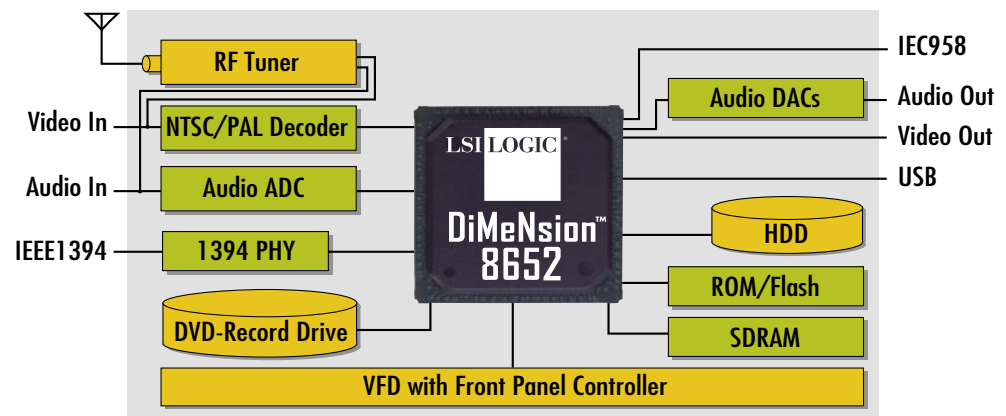



Figure 2: DMN-8652 DVD/HDD Recorder System




In addition to including a CPU, graphics engine, and complete audio and video systems, the DMN-8652 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. In addition, the DMN-8652 has two dedicated ATAPI controllers that support the DVD recorder and hard disk drives. There is built-in support for progressive video output. This high level of integration makes DMN-8652 one of the most comprehensive and cost-competitive HDD/DVD recordable solutions in the market today.

ARCHITECTURE

The DoMiNo architecture – the foundation of the DMN-8652 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-8652 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.



LSI Logic DiMeNtion™ 8652 HDD/DVD Recorder Processor

Summary of Specifications

Video Interface

Input	One 8-bit YUV 4:2:0 video stream
Output	Digital: One 16-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	10 channels, IDS compatible, 16-24 bits/sample, S/PDIF

I/O

Low Speed Serial	2x UARTS, SPI, IR, IR Blaster, IDC
Storage	2 IDE interfaces 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

Internal CPU 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	388 BGA

JTAG

Compliance	IEEE 1149.1 compliant boundary scan and PCB assembly testing
------------	--

For more information please call:

LSI Logic Corporation

North American Headquarters
Milpitas, CA
Tel: 866-574-5741

North America

Milpitas, CA
Tel: 1-408-490-8000
Fax: 1-408-490-8590

Europe

European Headquarters
United Kingdom
Tel: 44-1344-413200
Fax: 44-1293-651119

Hong Kong

Kowloon Tong, Hong Kong
Tel: 852-2192-1789
Fax: 852-2511-6939

China

Beijing, China
Tele: 86-10-626-38296
Fax: 86-10-626-38322
Chengdu, China
Tel: 86-28-667-8831
Fax: 86-28-667-8054

Japan

Tokyo, Japan
Tel: 81-3-5463-7821
Fax: 81-3-5463-7820

Korea

Seoul, Korea
Tele: 82-2-528-3400
Fax: 82-2-528-2250

LSI Logic, LSI Logic logo, DoMiNo, DiMeNtion, C-Ware, TrueScan, TrueView, PerfectView, Direct Digital Dub, and ZiVA are trademarks or registered trademarks of LSI Logic Corporation. All other brand and product names may be trademarks of their respective companies.

LSI Logic Corporation reserves the right to make changes to any products and services herein at any time without notice. LSI Logic does not assume any responsibility or liability arising out of the application or use of any product or service described herein, except as expressly agreed to in writing by LSI Logic; nor does the purchase, lease, or use of a product or service from LSI Logic convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual property rights of LSI Logic or of third parties.

Copyright ©2003 by LSI Logic Corporation.
All rights reserved.

Order No. I20111
1203.1K.JG.IK - Printed in USA

LSI LOGIC®