MPEG-2 PVR for Advanced Set-top Boxes

Harmony™ Reference Design

Harmony Features

- Complete standalone MPEG-2 Audio/Video Recorder and DVD Player Reference Design on a PCI card
- Includes: hardware development platform, software, firmware, schematics, BOM, Gerber files, and documentation
- Compliant to VCD, SVCD, and DVD specifications
- Real-time encoding and decoding of digital video in either MPEG-2 ML @ MP or MPEG-1
- Record in VCD, SVCD, DVD, or CD-DA formats
- Playback of VCD, SVCD, Audio CDs, DVDs, and Audio DVDs
- Both NTSC and PAL video formats supported
- Real-time encoding and decoding of two channel digital audio in MPEG or CD-DA formats
- Decodes Dolby Digital, up to 5.1 channels
- DTS pass through to S/PDIF
- Two channel downmixed analog output (surround)
- Features the Cirrus Logic CS92288 MPEG-2 audio/video codec for high quality video recording
- Features the Sigma Designs EM8455 processor for DVD playback and system control
- S-Video, Composite, DVI, RGB, YUV, YPbPr, and progressive output
- S/PDIF Input and Output
- Compatible with PCI interfaces, allowing for a wide range of choices for system configurations
- Supports the Linux operating system
- Full-duplex playback and recording
- Macrovision Protection
- Low total BOM enables aggressive product pricing

The Harmony™ reference design is a platform that enables fast development of cost effective consumer products that combine DVD playback with digital audio/video MPEG recording on a set-top box or other PCI-based products. Examples include: Advanced set-top boxes with Personal Video Recorders (PVRs), and home media servers with recordable DVD and Audio-CD.

Harmony is a joint reference design by Cirrus Logic and Sigma Designs. The design combines the power of the CS92288 MPEG audio/video codec with the flexibility of the EM8455 (or EM8475) DVD/MPEG-2 decoder processor. These two chips provide a high-quality, cost-effective solution.

The Harmony system consists of the CS92288 MPEG-2 audio/video codec, the EM8455 or EM8475 DVD processor, memory, a/v interface logic, and the Sil168 PanelLink® DVI transmitter with HDCP copy protection.

The CS92288 performs MPEG audio/video encoding and decoding. The EM8455 performs MPEG-2 or DVD decoding and system control. The Sil168 from Silicon Image provides an additional DVI-compliant video output interface.

Harmony combines DVD or MPEG-2 playback with MPEG-2 recording. A sample PVR application is available as part of the reference design.
Features
MPEG-1 or MPEG-2 A/V Encoding (CBR or VBR)
MPEG-1 or MPEG-2 A/V Video Decoding
DVD Decoding with navigation
Full-duplex recording and playback
A/V Mux/Demux
PCI Bus Interface
Time-shift Recording using HDD
Playback CD-DA
Playback DVD with Dolby Digital and DTS, True Surround
256 color OSD Graphics Interface with anti-flicker filter and alpha blending
Progressive Output at 480p and 720p
Interlaced Output at 1080
S/PDIF encoder
Macrovision Copy Protection v. 7.1
Macrovision for 480p, YPrPb progressive output

Functions
Play, Record, Pause, Reverse
Time-shift Recording
1/2 and 1/4 Speed Slow Forward
2x, 4x, or 8x Fast Forward
A-B Repeat

Deliverables
Harmony PCI Card
Applications Software
Firmware
Microcode
Linux Device Drivers
Schematics
Bill Of Materials
Gerber Files
Technical Manuals
CS92288 Data Sheets and Programming Guide
Sigma Designs Documentation
Start Up Guide

Interfaces
NTSC/PAL Video In (Composite and S-Video)
NTSC/PAL Video Out (Composite, S-Video, Component, DVI)
Progressive Video support (Component and DVI)
Analog Audio In - Left, Right
Analog Audio Out - Left, Right
S/PDIF Output (Dolby Digital, DTS, PCM)
S/PDIF Input using the CS8412 (PCM only)
I²C and I²S
PCI 2.1 master/slave Interface
DVI out, using the SiL168