

Full HD 4:4:4 Processing Video Display Processor



- ◆ **MDIN-360 is a highly integrated single chip implementation of format conversion, deinterlacing, video enhancement and graphic OSD with embedded MCU.**
- ◆ **MDIN-360 receives any format of interlaced scan video up to 1080i and progressive scan video up to Full HD, and performs deinterlacing and format conversion to produce any desired format of interlaced or progressive scan video up to Full HD with excellent signal quality preservation through internal 4:2:2 or 4:4:4 color processing.**
- ◆ **MDIN-360 provides dual channel video processing for two input video sources and generates PIP, POP and dual video output.**
- ◆ **MDIN-360 supports external lock function for broadcasting systems.**
- ◆ **MDIN-360 provides a versatile 2-D graphics engine with bitmap and character mode.**
- ◆ **MDIN-360's high quality format conversion, deinterlacing, video enhancement and OSD capability are suitable for digital display applications such as video converter, Pro AV device, various converter box, Video Wall & Matrix.**

Main Features

- ◆ Two Digital Video Input Ports for Interlaced or Progressive Scan Video up to Full HD
- ◆ Digital Video Output with CMOS Parallel or Serialized LVDS Interface and CVBS Video Output
- ◆ Internal 4:2:2 or 4:4:4 Color Processing
- ◆ One I²S Audio Input and Output for Audio Delay
- ◆ Motion Adaptive 2D/3D Noise Reduction
- ◆ External Lock Function for Broadcasting Systems
- ◆ Main and Auxiliary Video Paths for PIP or Dual Video Output
- ◆ Independent Horizontal and Vertical Scaling with Anti-aliasing Interpolation Filter
- ◆ Horizontal and Vertical Peaking Filter and Color Enhancement Processing for Crisper Picture Quality
- ◆ 2 OSD Layers with 4 Sprites Per Layer (Bitmap and Character Mode)
- ◆ Embedded 32-bit MCU and SDRAM

Specifications

Video Input
Digital Video Input with up to 10-bit Precision
Input Resolution
Progressive Video : up to 1920x1200p60 (4M 30fps)
Interlaced Video : up to 1920x1080i (1920x1152i)
Video Format
Sub-sampling Type: RGB / YCbCr 4:4:4 or YCbCr 4:2:2
Y/C Type : Multiplexed (BT.656) or Separated (BT.601)
Sync Type : Separate or Embedded (BT.1120 or BT.656)
Digital Input : BT.656 4:2:2 8/10-bit,
BT.601/1120, SMPTE 4:2:2 16/20/32/40-bit
RGB/YCbCr 4:4:4 12/15/24/30/48-bit
Single / Dual-Wide / Dual-Edge mode

Video Output
Digital Video Output
Output Resolution
Progressive Video : up to 1920x1200p60 (4M 30fps)
Interlaced Video : up to 1920x1080i (1920x1152i)
Video Format
Sub-sampling Type: RGB/YCbCr 4:4:4 or YCbCr 4:2:2
Y/C Type : Multiplexed (BT.656) or Separated (BT.601)
Sync Type : Separate or Embedded (BT.1120 or BT.656)
Digital Output : BT.656 4:2:2 8/10-bit
BT.601/1120, SMPTE 4:2:2 16/20/32/40-bit
RGB/YCbCr 4:4:4 12/15/24/30/48-bit
Single / Dual-Wide / Dual-Edge Mode
Serialized LVDS Output
Same Resolution and Video Format as Digital Video Output
Composite Video Output
NTSC / PAL : 720H or 960H

Deinterlacing and Noise Reduction
Motion Adaptive 3D Deinterlacing
Motion Adaptive 2D / 3D Noise Reduction

Format Conversion
Internal 4:2:2 or 4:4:4 Color Processing
Independent Horizontal and Vertical Scaling with Anti-aliasing Interpolation Filter
Format Conversion from One Format to Another Format with an Arbitrary Scaling Ratio
Scaling Ratio : x1/15 ~ Unlimited
Non-uniform Scaling for Panorama Mode
Programmable Size & Position Zoom In / Out

Frame Rate Conversion
Frame Rate Conversion from 3-250Hz to 3-250Hz
Conversion Ratio : x1/31 ~ x31

Display Functions
Brightness, Contrast, Hue, Saturation and Color Space Conversion
Programmable Output Sync Generation
Lock-to-input Sync Mode or Free-run Mode
Video Overlay on Background Video
PIP and POP Display

Video Enhancement
High Order Programmable Horizontal and Vertical Peaking Filter
Filter for Color Component Enhancement
Independent Color Control (ICC)
Dynamic Contrast Enhancement (DCE)

OSD
Four Layers : Two Layers with 4 Sprites Per Layer
One Cursor and One Background Layer
Up to 256-color Palette Mode Bitmap
16, 24 or 32-bit Full Color Mode Bitmap
Sprite, Palette or Pixel Based Alpha Blending
Up to 32 x 63 Font Size and 1-bpp, 2-bpp or 4-bpp Font Color
32-row x 16-col or 16-row x 32-col Character Map
Bitmap Fill, Copy and Run-length Decoding

MCU and Communication Interface
Embedded 32-bit MCU
External Serial Flash memory Interface (4-wire SPI Master)
External Interface with 4-wire SPI and 2-wire I ² C

Frame Buffer Memory
Embedded Frame Buffer Memory

Miscellaneous
Auto Detection of Input Video / Sync
Internal Programmable PLLs
Genlock to Background Video Sync
Built-in Test Pattern Generation Logic

Electrical and Mechanical Characteristics
1.2V, 1.8V, 2.5V & 3.3V Supply Voltage
Low Power Consumption
196-pin FBGA Package (12mm x 12mm / 0.8mm pitch)