

Image Signal Processor for 5M/6M/8M Pixel Image Sensor



- ◆ MDIN-i540 is a high performance Image Signal Processor for up to 8M pixel(4K30P) image sensor. It receives RGB bayer signal from image sensor in sub-LVDS or CMOS interface format and provides digital YCbCr/RGB in CMOS or LVDS interface format and composite video.
- ◆ MDIN-i540 supports excellent camera functions. For image sensor and optical lens control, programmable 3A (AE/AWB/AF), LSC, HLC/BLC, DPC functions are provided.
- ◆ For the high performance camera applications, MDIN-i540 provides various picture enhancement functions such as NR, WDR, Tone Mapping, D-WDR, Defog, DIS, Color Correction and so on.
- ◆ MDIN-i540 also provides various features such as Digital Zoom, PIP, Rotation / Mirror, Gamma Correction, Motion Detection, Privacy Masking and OSD.
- ◆ Embedded 32-bit MCU in the MDIN-i540 provides IRIS and D/N control functions. Various communication ports (SPI, I²C and UART) and user programmable GPIOs are also supported.
- ◆ MDIN-i540 is suitable for high quality video processing application for surveillance camera such as IP camera, SDI camera and analog camera (AHD, TVI and CVI). Also, MDIN-i540 is very valuable for industrial camera and medical camera.

Main Features

- ◆ Image Signal Processor for 5M / 6M / 8M Pixel Image Sensor
- ◆ Programmable AE/AWB/AF
- ◆ Motion Adaptive 2D/3D Noise Reduction
- ◆ WDR with Multiple Exposure Frames
- ◆ Tone Mapping
- ◆ DIS (Digital Image Stabilization)
- ◆ Digital Zoom, Electronic PTZ, PIP
- ◆ Rotation for Corridor Format
- ◆ Defog
- ◆ BLC/HLC (Back Light / High Light Compensation)
- ◆ Digital Slow Shutter
- ◆ Flicker Detection
- ◆ Black Level Compensation
- ◆ Defect Pixel Correction
- ◆ Lens Shading Correction
- ◆ Frame Rate Conversion
- ◆ Motion Detection & Privacy Masking
- ◆ OSD with 2D Graphic Engine

Specifications

Video Input
Image Sensor Input
10/12-bit Bayer Input
4/6/8-ch Sub-LVDS Serial and 12-bit CMOS Parallel Interface
up to 4096x2160@30fps (8M Pixels)

Video Output
Digital CMOS Parallel Output
Programmable standard or non-standard video format
Sub-sampling type : RGB/YCbCr 4:4:4 or YCbCr 4:2:2
Resolution : Progressive scan up to 4096x2160@30fps (4K30P)
Interlaced scan up to 1920x1080i (1920x1152i)
Format : YC 4:2:2 8/10/16/20-bit(Multiplexed or separated),
YC/RGB 4:4:4 24/30-bit, BT.1120, BT.601 and BT.656 standard
Single / Dual-Wide / Dual-Edge Mode
Dual digital video output
Serialized LVDS Output
Max 2-port single lvds mode output or dual lvds mode output
Sub-sampling type : RGB/YCbCr 4:4:4 24/30-bit or YCbCr 4:2:2 16/20-bit
Resolution : up to 1920x1080@30fps in single mode
and 1920x1080@60fps in dual mode
PLL requires no external components
Composite Video Output : NTSC / PAL : 720H or 960H

Image Sensor and Lens Control
3A with Programmable AE / AWB / AF Parameters
Back Light Compensation (BLC) & High Light Compensation (HLC)
Defect Pixel Correction (DPC) with Dynamic and Static Detection
Lens Shading Correction (LSC)

Noise Reduction
Noise Adaptive 2D Edge Preserving Filter
Motion Adaptive 3D Filter
Dynamic Impulse Noise Removal

Wide Dynamic Range
Multi-Frame WDR : Line Mode or Frame Mode (Supports Up to 3Mega)
Tone Mapping for Built-in WDR Sensor
Single-frame WDR (D-WDR) for Full Frame Rate

Defog
Visibility Enhancement on the Low Contrast Scene
Removes Bad Weather Factors such as Fog, Mist, Dust and Smoke

DIS (Digital Image Stabilization)
Removes Image Jitter due to Shaking of Camera
Excellent Stabilization Performance with Wide Motion Estimation

Format Conversion : D-Zoom & PIP
Independent Horizontal and Vertical Scaling with Anti-aliasing Filter
Zoom Ratio : x1 ~ Unlimited
PIP by Two Independent Scalers (Programmable Size & Position)

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

Motion Detection
Detection Resolution : 16x16, 32x32 or 64x64 Pixel
Four Motion Detection Windows
Programmable Motion Detection Threshold

Privacy Masking
Rectangle and Polygon Type
Programmable Color Mask Display

Video Enhancement
Edge Enhancement
Color Component Enhancement
Zone Depending Saturation & Hue Control

OSD
Four OSD Layers : Two OSD, One Cursor, One Background Layer
Up to 256-color Palette Mode Bitmap
16, 24 or 32-bit Full Color Mode Bitmap
Up to 32x63 Font Size and 1-bpp, 2-bpp or 4-bpp Font Color

MCU and SDRAM
Embedded 32-bit MCU with External Serial Flash Memory
2 x SPI Ports (Master & Slave) and 2 x I ² C Ports (Master & Slave)
Embedded LPDDR2 SDRAM

Miscellaneous
Brightness, Contrast, Hue and Saturation Control
Freeze, Mirror, Flip, Rotation (Corridor Format)
Frame Lock with Sensor Slave Mode
Built-in Test Pattern Generation Logic

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