RAA278830D

Dual Channel Open-LDI Bridge for Automotive Displays Supporting up to ASIL-B Functional Safety

Description

The RAA278830D is a highly integrated LCD video processor that integrates many of the features necessary to design an ISO26262 ASIL-B Automotive display system. This includes two LVDS Open-LDI input interfaces, two separate video processing pipes, a versatile On-Screen Display (OSD) which includes both a Font based OSD and a bitmap SPI-OSD, a Q-SPI flash interface, as well as a dual channel LVDS Open-LDI output panel interface. The RAA278830D can support inputs with horizontal resolutions up to 2560 and a pixel clock up to 150MHz. The RAA278830D's video processing capability includes arbitrary H/V scaling, panoramic scaling, image mirroring, image adjustment and enhancement, 10-bit gamma and dither, and many more video processing features. In addition, the RAA278830D has new, improved image diagnostic capabilities to determine if the input video is frozen or corrupted.

The RAA278830D feature set, versatility, and ISO26262 ASIL-B functional safety design makes it an ideal solution for safety critical Automotive LCD display applications.

Features

- Video Input Support
  - Supports two channels Open-LDI inputs up to 150MHz in each channel
  - Supports VESA and JEIDA format
- TFT Panel Support
  - Supports two channels Open-LDI outputs up to 104MHz in each channel
  - Supports VESA and JEIDA format
  - Supports 3, 4, 6 or 8 bits per pixel up to 16.8 million colors with built-in dithering engine
- Font Based On Screen Display
  - Four window font OSD with bordering / shadow
  - 20KB programmable font RAM and 1024 display RAM
  - 1/2/3/4 bits/pixel
  - Supports variable width (12/16), height (2~32)
- SPI Flash Based On Screen Display
  - 9 bitmap based OSD windows in two layers through SPI Flash memory interface
  - Supports blending between layers and video
  - Supports 4/6/8 bits/pixel
  - Supports up to 142MHz SPI clock frequency
- SPI Flash Interface
  - Quad SPI flash interface for SPI-OSD and fast boot register programming
  - Fast boot register programming triggered by HW reset, register and SAFEIN pin transition
- Image Processing
  - High quality scaler with both up/down and panorama / water-glass scaling support
  - Programmable brightness, contrast, saturation, hue and sharpness
  - Supports programmable cropping of input video and graphics
  - Independent RGB gain and offset controls
  - Programmable 10-bit Gamma correction for each color
- Clock Generation
  - Spread spectrum PLL integrated to each scaler path
  - Programmable modulation frequency and spread width
- Functional Safety (FuSA)
  - Designed to support ISO26262 ASIL-B
  - Supports I^2C/SPI host interface protection by CRC
  - Supports Two Input video measurement engines for Timing measurement, Input video loss detection, Phase, Luminance and RGB Min/Max measurement
  - Supports Frame CRC, and Frame Counter checking in embedded line data
  - Supports Video path CRC checker in every stage of video pipe
  - Supports up to 34 sub-window CRC checking for Telltale Icon checking
  - Supports Clock Monitor for all input, output and internal clocks
  - Supports LVDS-TX serializer checker by internal de-serializer
  - Supports LVDS-TX toggle check
  - Supports Register CRC checking
  - Supports Parity checker for OSD, Gamma memories

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  - Supports LBIST at power up
  - Supports SAFEIN pin input for auto SM
  - Supports 50 Block Measurement for Luminance, Phase
- Miscellaneous
  - Fast Mode Plus I^2C host interface up to 1.2Mbps with optional CRC8 protection
  - SPI host interface up to 25MHz with optional CRC8 protection
  - Secondary host interface by pin sharing
  - I^2C or SPI with full arbitration between hosts
  - Up to 2 x 10-bit PWMs
  - GPIOs
  - 1.2V internal operation
  - 1.8/3.3V I/O support
  - Single 27MHz crystal
  - 72-pin QFN with exposed thermal pad

Applications

- Automotive Display systems
- Digital Instrument Cluster display
- Heads Up Display systems