

IMAGE PROCESSORS

Product Description

The IP00C821 is an enhanced multi-functional image processing LSI with integrated 2-channel scalar and de-interlacer cores as well as a 1-channel warping and edge-blending engine. Dual input images are fully independently enlarged, shrunk and de-interlaced with PiP/PoP output images.

This device has an embedded CPU, and peripherals such as LVDS Tx, video-decoder, USB, Ethernet, and SD card. It also has other image control functions such as gamma and uniformity correction that are required for higher image quality. The IP00C821 is an ideal device for a wide range of a high performance video applications like projectors, and monitors.

Features

Input (2-port)

- RGB 30bit/YUV4:4:4 30bit/YUV4:2:2 20bit/YUV4:2:2 10bit (BT656) 166MHz LV-CMOS (2-port) supporting dual (EVEN/ODD) and DDR inputs
- Analog input: CVBS (NTSC, PAL, SECAM)

Output (1-port)

RGB 30bit/YUV4:4:4 30bit/YUV4:2:2 20bit/YUV4:2:2 10bit (BT656) 166MHz high speed LVDS/83MHz x2 LVDS

Input & Output Image Size

Up to 16384 pixels/line with 2048 of horizontal active video

External Memory

DDR3-SDRAM 16bit PC1600 (4G/2G/1G bit x 16) x 1

Input/Output Sync

- Frame rate conversion
- Tearing protection
- External force synchronization

Video Decoder

- NTSC-M, JPN, 4.43 PAL-B, D, G, H, I, Combination N, 60, SECAM
- VBI (Closed Caption/CGMS/WSS) data extraction
- Clamp pulse output

De-interlacer

- Motion adaptive filter based on Y, U, V
- All major cadences supported
- YUV4:2:2

Scaler

- 6 symbol filter with FIR filter (10bit/pixel), embedded ROM (64 sets)

Noise Reduction

3D (H, V, Temporal)/Mosquito/Block NR, chroma error filter

Bit Map OSD

- 256 colors/High color OSD
- Embedded font engine (65536 words)
- Blinking and semi-transparent (4 colors) OSD
- 90-degree rotation, OSD scroll
- Serial flash to bitmap

2K Dual Input PiP

De-interlacer/Scaler/Warping/Edge-blending LSI

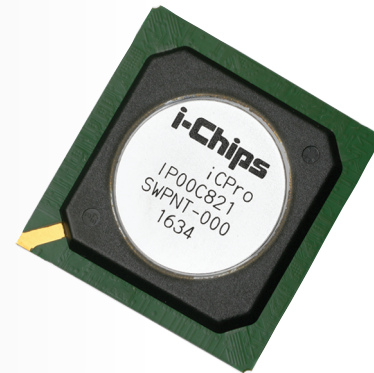


Image Quality Control

- Edge-blending (RGB independent gamma correction, white peaking, by region and per pixel correction)
- Color management (full color gamma)
- Uniformity correction (by region and per pixel available)
- Bias/Gain/Gamma correction
- H/V edge enhancement (9 symbols)
- Dithering for 10, 8, and 6 bits output

Image Manipulation

- Warping (coordinate correction look up table, embedded warp table generator for key stone correction)
- Any angle rotation (up to 45 degree rotation + 90 degree rotation)
- Mirror/flip/90-degree rotation
- 2-ch overlay, alpha blending, color key blending

Embedded CPU

- ARM926EJ-S equivalent (ARM V5TE except for jazelle and ETM9) *
- Cache (16KB Instruction, 16KB data)
- Work RAM (128KB)
- 8-bit parallel/4-wire serial when external CPU is in use

CPU Interface

- Direct connection with external parallel or serial flash/SRAM/SDRAM
- Address/data width 26bit/16bit

CPU Peripherals

- Ethernet, USB2.0, SD Card
- DMAC(8ch)/UART(3ch)/I2C(master/slave 3ch)
- Timer(6ch)/Interruption control/IR remote control
- 10bit ADC(8ch, MUX)/10bit DAC(3ch)

xvYCC/Bt-2020 are fully supported

Power Supply

3.3V/2.5V/1.5V/1.0V

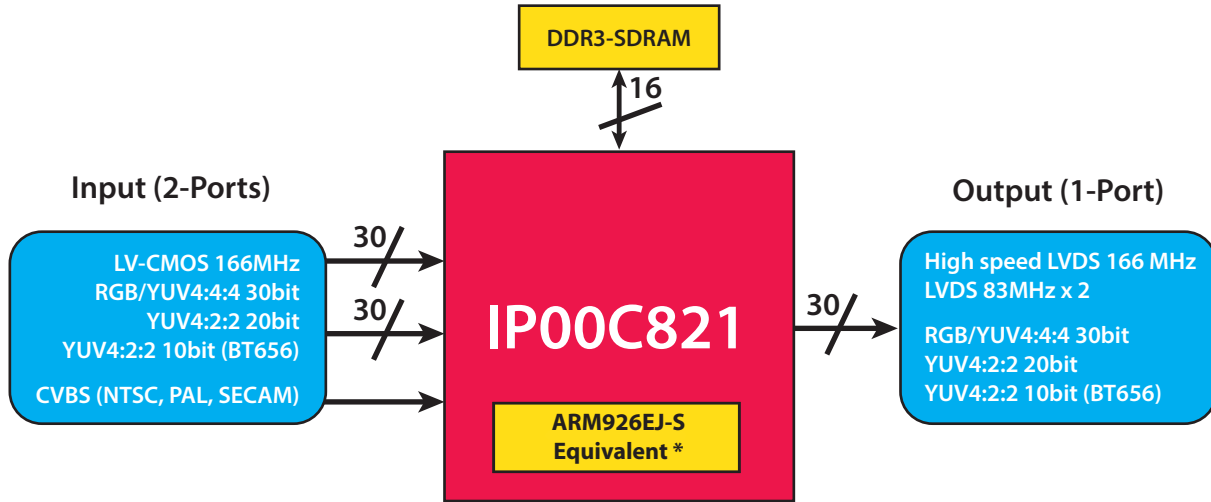
Package

484-pin plastic BGA (1.0mm pitch, 23mm x 23mm)

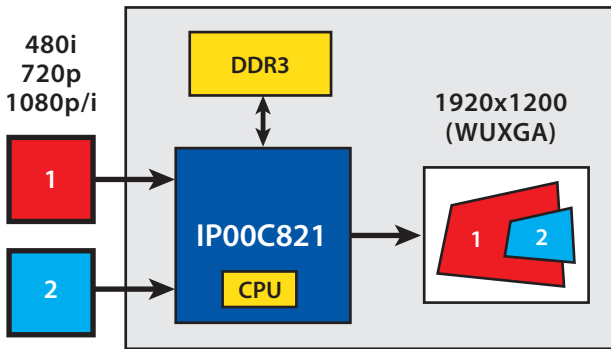
* ARM926EJ-S and ETM9 are trademarks of ARM Ltd.

IP00C821 2K Dual Input PiP De-interlacer/Scaler/Warping/Edge-blending LSI

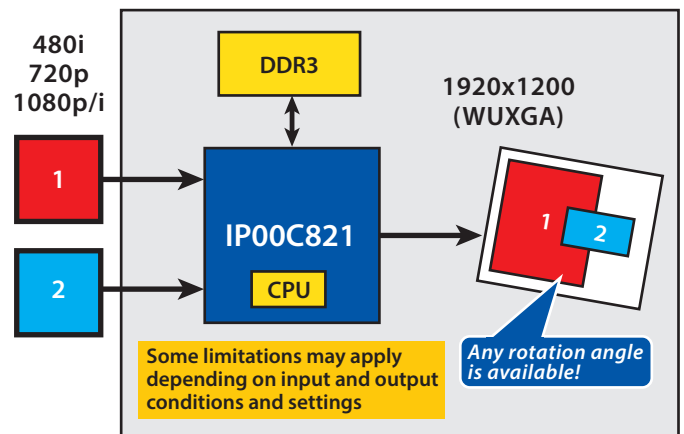
IP00C821 Block Diagram



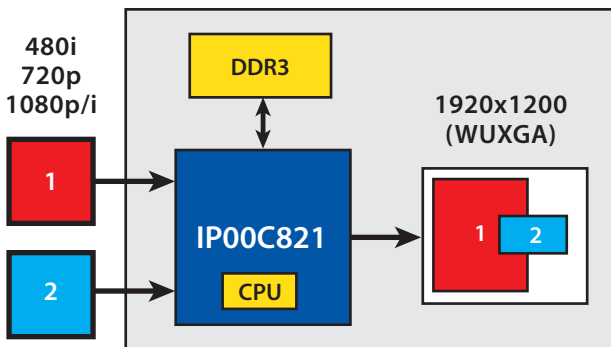
Dual Input, Single Output System - PiP & Warping



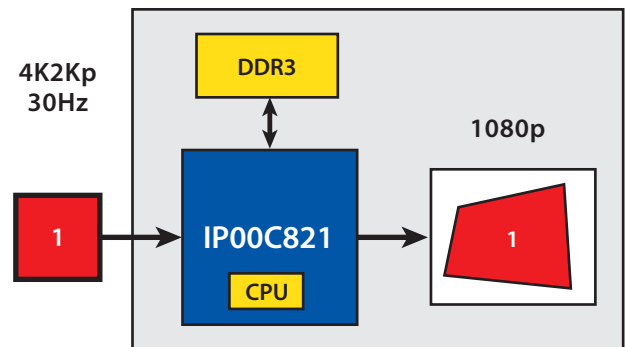
Dual Input, Single Output System - PiP & Rotation



Dual Input, Single Output System - PiP (No Warping)



4K30Hz to 1080p Downscaling System with Warping



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For more information please visit: www.i-chips.com or info@i-chips.com

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