i-Chips

I M A G E   P R O C E S S O R S

IP00C335

Embedded frame memory 4K Multiple Input/Output De-interlacer/Scaler LSI

Product Description

The IP00C335 is an embedded frame memory multi-functional 4K de-interlacer and scaler LSI with high speed serial interface (Tx/Rx of V-by-One® HS). This chip has 8 internal scalers and 4 internal de-interlacers that provide high speed signal processing (clock of 333MHz each). It allows to design a one chip solution that can process 4 streams of 4K60Hz. Features include image overlay (PiP/PoP), independent zooming/shrinking and de-interlacing. The IP00C335 also supports PQ and Hybrid Log-gamma curves for HDR processing.

Features

Input (4K60Hz 4-port)
- 30-bit RGB/YUV4:4:4/ YUV4:2:0, 20-bit YUV4:2:2
- @V-by-One® HS 4Gbps, 8-lane 4-port
- 4K60Hz input up to 4-port
- 4K120Hz input supported, 8K60Hz input supported

Output (4K60Hz 2-port)
- 30-bit RGB/YUV4:4:4/YUV4:2:0, 20-bit YUV4:2:2
- @V-by-One® HS 4Gbps, 8-lane 2-port
- 4K60Hz dual output (all the time)
- 4K120Hz output supported, 8K60Hz output (YUV420) supported

External memory
- No need(Embedded with LPDDR3 PC-1600 2Gbit)

Input/Output Sync/ Asynchronous Behavior
- Frame rate conversion/ Tearing protection
- External force synchronization, Genlock

De-interlacer
- Motion adaptive de-interlacer
- High performance motion detection filter (Y, U, V)
- Multi-cadences, Low latency processing (4-port)

Scaler
- Zoom/Shrink 6-symbol (10bit/pixel), Coefficient ROM(64set)
- 333Mpix/sec 8-ch, support 4K60Hz 4-image processing

Image Manipulation
- Mirror/flip/90-degree rotation
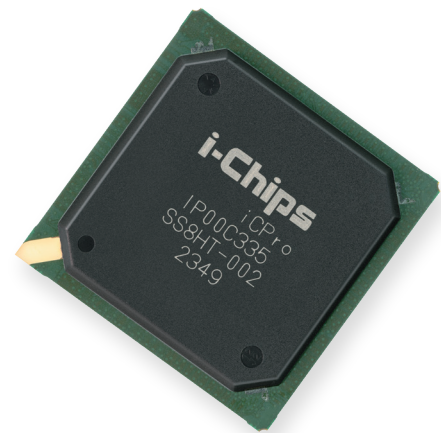- Overlay, Alpha blending, Chroma key blending

Image Quality Control
- Full color gamma, 3DLUT (4K60Hz x2 input supported)
- Uniformity correction (by region & per-pixel)
- Bias/Gain/Gamma correction
- H edge enhancement (9-symbol)/V edge enhancement (5 or 9-symbol)/Spatial enhancement
- Error diffusion (12→10),(10→8)

Bt.2020
Fully supported

HDR standard
- SMPTE ST2084(PQ HDR10) and HLG methods supported (RGB 10-bit each)

Noise reduction
- 3DNR (H, V, Temporal), MPEG-NR(Mosquito/Block)
- Chroma error filter

Bitmap OSD
- 256 colors/High color OSD (64K colors)
- Blinking & Semi-transparent (4 colors OSD)
- 90-degree rotation, OSD scroll

CPU Interface
8-bit parallel/4-wire serial
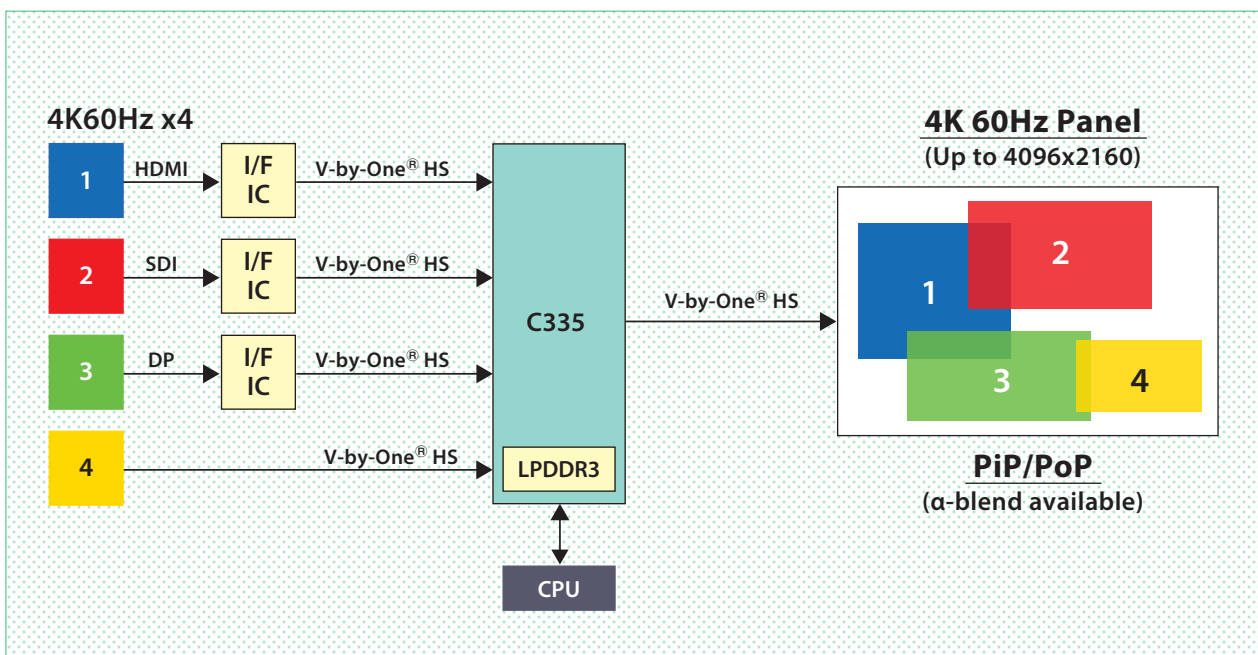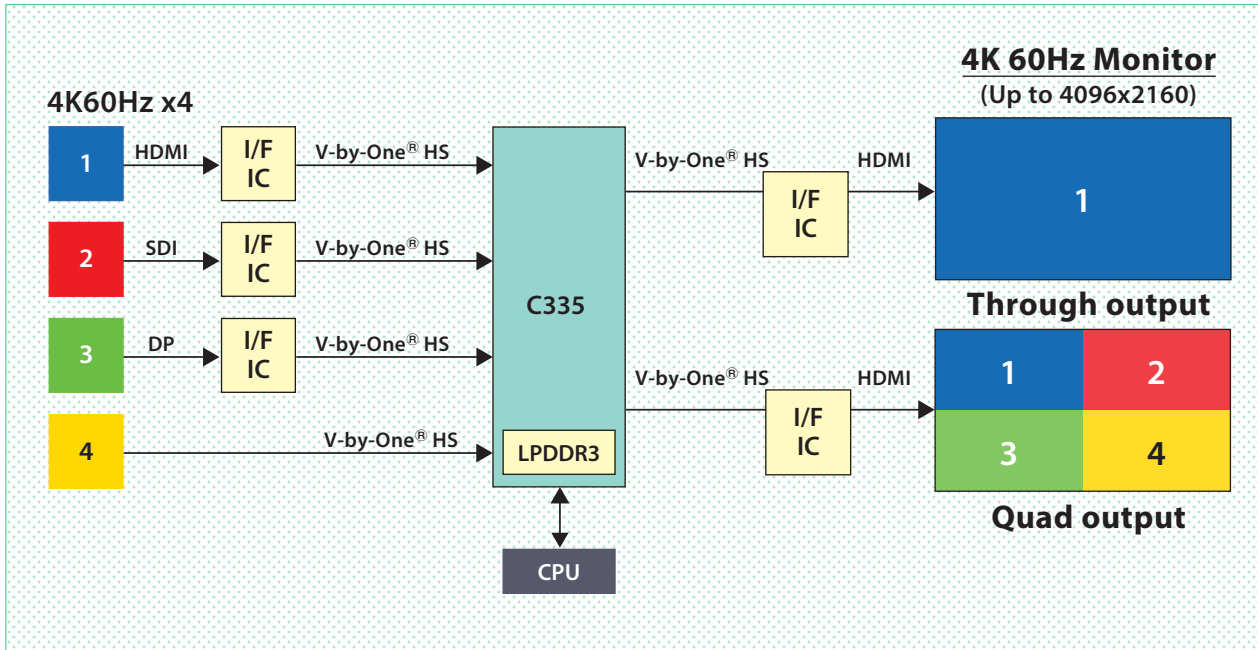
Power supply
3.3V/1.8V/1.2V/1.1V

Package
593-pin, BGA (0.8mm pitch), 27mmx27mm

IP00C335 Embedded frame memory 4K Multiple Input/Output De-interlacer/ Scaler LSI

Application Diagrams

IP00C335 4K60Hz Quad Input System

4K60Hz x4

1	HDMI → I/F IC → V-by-One® HS
2	SDI → I/F IC → V-by-One® HS
3	DP → I/F IC → V-by-One® HS
4	V-by-One® HS

C335 — LPDDR3 ↔ CPU

4K 60Hz Monitor (Up to 4096x2160)

V-by-One® HS → I/F IC → HDMI → **1** — **Through output**

V-by-One® HS → I/F IC → HDMI → **1 2 / 3 4** — **Quad output**

4K60Hz x4

1	HDMI → I/F IC → V-by-One® HS
2	SDI → I/F IC → V-by-One® HS
3	DP → I/F IC → V-by-One® HS
4	V-by-One® HS

C335 — LPDDR3 ↔ CPU

4K 60Hz Panel (Up to 4096x2160)

V-by-One® HS → **1 2 3 4** — **PiP/PoP** (α-blend available)

※ "V-by-One" is trademark of THine Electronics, Inc.

For more information please visit:**www.i-chips.co.jp**

i-Chips Technology, Inc.

• 1-2-6, Shioe Amagasaki, Hyogo, 661-0976, Japan • Tel: 81-6-6492-7277