## Product Description

The IP00C251 is a 4K 3-channel Cross Point Switch LSI with built-in high-speed serial interfaces of V-by-One®HS/LVDS Tx and V-by-One®HS/LVDS Rx in one chip.

It can be used to connect high-speed image signals between multiple chips, including FPGAs, such as conversion between V-by-One®HS and LVDS and split/select image signals.

In addition, the built-in line buffer makes it possible to exchange images among three synchronized input images. Furthermore, it is also possible to perform overlay/chromakey processing on synchronized 3-channel input images and synthesize them into 1 channel.

## Features

### Input (4K60Hz x3)
- 30-bit RGB/YUV4:4:4/ YUV4:2:0, 20-bit YUV4:2:2
  @V-by-One 4Gbps, 8-lane  2-port
  @LVDS 160MHz x 4, FPD-Link, 1-port
- 4K60Hz input up to 3-port

### Output (4K60Hz x3)
- 30-bit RGB/YUV4:4:4/ YUV4:2:0, 20-bit YUV4:2:2
  @V-by-One 4Gbps, 8-lane  2-port
  @LVDS 160MHz x 4, FPD-Link, 1-port
- 4K60Hz output up to 3-port
- 3×3 Cross Point Switch for 4K60Hz

### Input/Output Image size
- Horizontal synchronization signal interval: 16,384 pixels
- Effective horizontal image area: 2,176 pixels

### Genlock function
- Available for synchronization.

### Resolution Conversion
- Horizontal Scaling down: 6-symbol LUT
- Coefficient ROM(64-set)
- 333Mpix/sec 4ch, support 4k60x2 images processing

### Image Manipulation
- Flip function
- Overlay function
- Alpha Blending
- Chroma Key

### CPU Interface
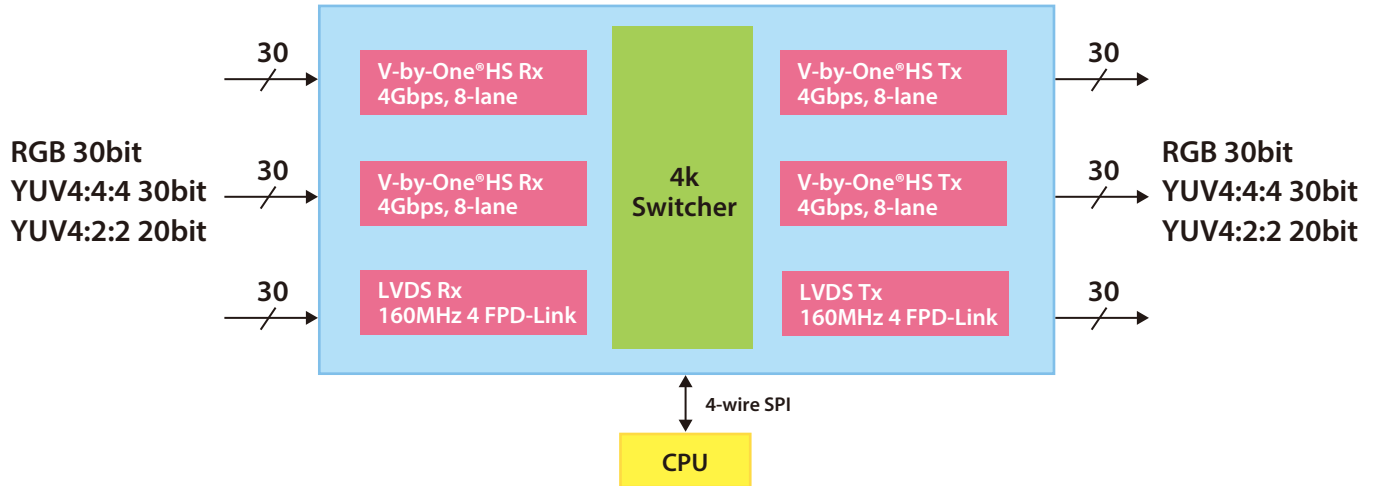4-wire SPI

### Power supply
3.3V/2.5V/1.1V

### Package
385-pin, BGA (0.8mm pitch), 19mmx19mm
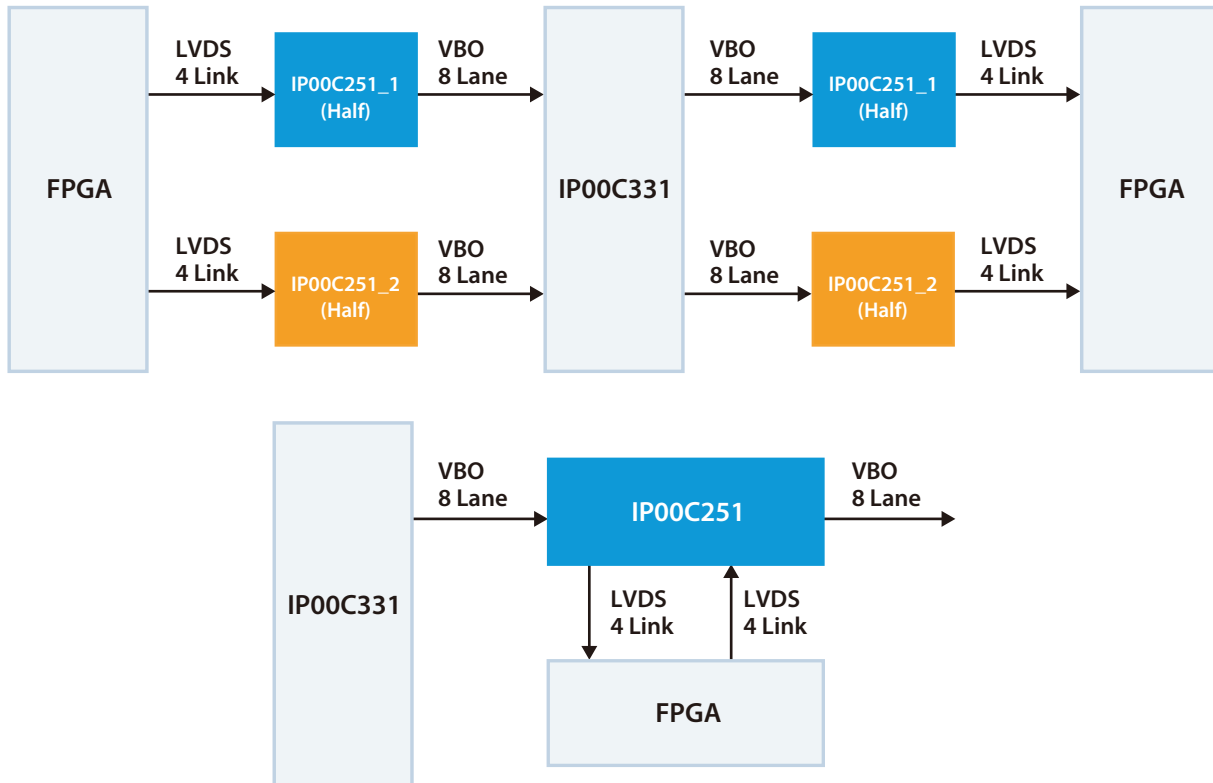
# IP00C251  3 × 3 Cross Point Switch LSI for 4K60Hz

## Block Diagram

**Input(3-port)**

**Output(3-port)**

RGB 30bit
YUV4:4:4 30bit
YUV4:2:2 20bit

| | |
|---|---|
| V-by-One®HS Rx 4Gbps, 8-lane | V-by-One®HS Tx 4Gbps, 8-lane |
| V-by-One®HS Rx 4Gbps, 8-lane | 4k Switcher | V-by-One®HS Tx 4Gbps, 8-lane |
| LVDS Rx 160MHz 4 FPD-Link | LVDS Tx 160MHz 4 FPD-Link |

30

30

30

30

30

30

RGB 30bit
YUV4:4:4 30bit
YUV4:2:2 20bit

4-wire SPI

CPU

## Application Samples  [IP00C331 and FPGA I/F]

FPGA

LVDS 4 Link → IP00C251_1 (Half) → VBO 8 Lane

LVDS 4 Link → IP00C251_2 (Half) → VBO 8 Lane

IP00C331

VBO 8 Lane → IP00C251_1 (Half) → LVDS 4 Link

VBO 8 Lane → IP00C251_2 (Half) → LVDS 4 Link

FPGA

IP00C331

VBO 8 Lane → IP00C251 → VBO 8 Lane

LVDS 4 Link    LVDS 4 Link

FPGA

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

# i-Chips Technology, Inc.