



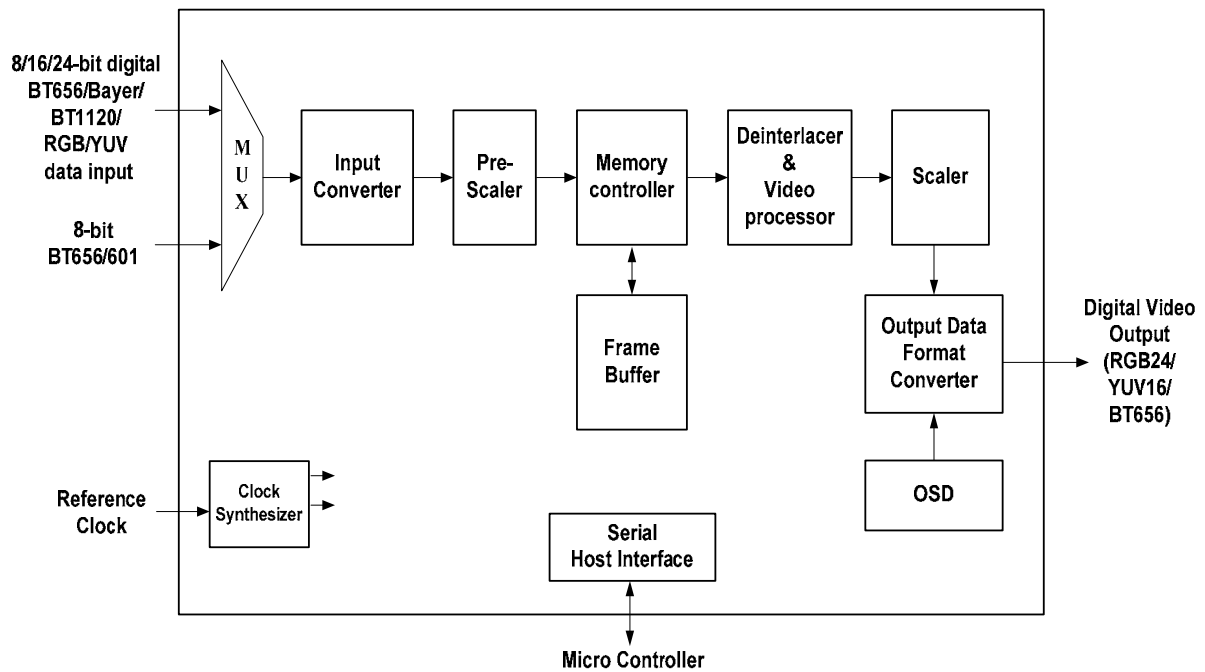
VS9989

HIGH DEFINITION VIDEO PROCESSOR AND MULTI FORMAT CONVERTER

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1. BLOCK DIAGRAM


2. FEATURES

- Support Various Digital Video Input Formats
 - 8-bit interlace BT.656 or progressive input
 - 8-bit ITU-R BT.601 + Horizontal Sync + Vertical Sync
 - 16-bit Y/UV with sync or BT1120 input
 - 24-bit RGB/YUV input
 - 8-bit CMOS Raw Bayer format data
- Resolutions of all input format are up to 1080i/1080P
- Support Various Digital Video Output Formats
 - 24/18/16-bit RGB + Horizontal Sync + Vertical Sync
 - 24-bit 4:4:4 YUV + Horizontal Sync + Vertical Sync
 - 24-bit 4:4:4 YPbPr + Horizontal Sync + Vertical Sync
 - 16-bit 4:2:2 YUV + Horizontal Sync + Vertical Sync
 - BT.1120 16 bit output
 - 8-bit Bayer format output + Horizontal Sync + Vertical Sync
 - BT.656 8-bit progressive / interlace output
- Resolutions of all output format are up to 1080P
- Support UHD 4Kx2K@30Hz input to 1080P@60Hz output transformation
- Support mux select for simultaneous max four BT.656 inputs or one RGB24 with one BT.656 inputs or two YUV16 inputs.
- Frame rate up-conversion to 60 Hz or more
- Frame rate down to 1 Hz video output or less
- Motion-Adaptive 3D Deinterlace
- Edge-Preserving Pixel Interpolation
- Cross color suppression
- Embedded Scaling Engine (Relács), Supporting progressive Output Resolution from 320X240 to 1920X1200
- Programmable scaler
- Brightness, Contrast, Saturation, and Hue Adjustment
- Color Transient Improvement, Adaptive Black-Level Extension
- Video Noise Reduction
- Frequency Directive Picture Sharpening
- Image Signal Processing
 - Auto white balance
 - Auto focus
 - Auto exposure

- Adaptive 2D/3D noise reduction
- edge enhancement
- Image flip, mirror, still
- 3-Channel 10-Bit Build-In Color gamma Look-Up Table for Video Fine-Tune
- Host Interface Compatible with Two-Wire IIC, Serial Interface
- OSD with 128 Build-in and 64 Programmable Font and Attribute Table, 16 Colors at same Time from 16,777,216-Color Template, Blinking, and Blending
- R/G/B output port swap & rotation control
- R/G/B input port swap & rotation control
- SDRAM emdedded
- One 27 MHz crystal
- 1.8V / 3.3V power supply
- 100pin LQFP

3. PINOUT DIAGRAM


4 PIN DESCRIPTION

Video Input Pins			
Name	Type	Description	Notes
RIN7~0	I	Red input data	
GIN7~0	I	Green/BT656/Bayer input data	
BIN7~0	I	Blue input data	
RGBIN_VS	I	Input Vertical Synchronization	
RGBIN_HS	I	Input Horizontal Synchronization	
RGBIN_CLK	I	Input Data Clock	
VID [7:0]	I	Digital Video Input Data(BT 656/601)	
VIHS	I	Digital Video Input Horizontal Synchronization	
VIVS	I	Digital Video Input Vertical Synchronization	
VICLK	I	Digital Video Input Clock	
Video Output Pins			
Name	Type	Description	Notes
ROUT [7:0]	O	R/V/Pr Digital Video Output	
GOUT [7:0]	O	G/Y/BT656 Digital Video Output	
BOUT [7:0]	O	B/U/Pb Digital Video Output	
VOHS / GPO1	O	Video Output Horizontal Synchronization / GPO1	
VOVS / GPO0	O	Video Output Vertical Synchronization / GPO0	
VOCLK	O	Video Output Clock / BT656 Output Clock	
GPIO0	I	Input Video Data Enable (DEI) / Video input clock	
	O	GPO0 output	
GPIO1	I	Video input clock	
	O	GPO1 output, Output Video Data Enable(DEO)	
GPIO2	I	Video input clock	
	O	GPO2 output	
Miscellaneous I/O Pins			
Name	Type	Description	Notes
RESETB	I _{PU}	Chip Reset (Active Low)	
XTAL_OUT	XO	Crystal Output	
XTAL_IN	XI	Crystal Input	
SDA	I _{PU} /O	Host Interface Serial Data / Address	
SCL	I _{PU}	Host Interface Serial Clock	
TEST_ENB	I _{PU}	Test Mode Enable (Active Low)	
Power Pins			
Name	Type	Description	Notes
VDD33	P ₃₃	Digital 3.3V power for I/O	Qty: 9
VSS33	G	Digital Ground For I/O	Qty: 9

VDD18	P ₁₈	Digital 1.8V Power for Core	Qty: 4
VSS18	G	Digital Ground for Core	Qty: 4
note :			
I		3.3V input	
O		3.3V output	
I/O		3.3V input/output	
I _{PU}		3.3V input with internal pull up	
XI,XO		crystal input, output pin	
P ₃₃		3.3V power pin	
P ₁₈		1.8V power pin	
G		Ground pin	

5 PACKAGE
LQFP-100
