Product Brief gmZ4

C0012-PBR-01C

Highly Integrated High Quality LCD controller

The Genesis Microchip gmZ4 is a third generation image enhancement IC based on Genesis' patented Advanced Image Magnification technology. The gmZ4 is a highly integrated chip that simplifies the implementation of multi-synchronous controller systems and enables low system cost solutions. Flexibility and support for all resolutions **up to UXGA** make the gmZ4 the optimal single solution for all segments of the LCD monitor and projection system markets.

FEATURES

- Scaling up and down (all resolutions from VGA to UXGA)
- Frame rate conversions from 50 Hz to 85 Hz
- On-chip programmable OSD engine
- Embedded microcontroller
- Integrated PLLs
- Digital brightness and contrast adjustments
- Programmable Gamma Correction (CLUT)
- Dual 48-bit input port to support analog and/or digital I/F
- Seamless interface to standardized TMDS receivers
- 1 GByte/sec I/O bandwidth
- 3.3 Volt operation, 5 Volt tolerant I/O

♦ **High-quality advanced scaling engine**
- Fully programmable zoom ratios
- Arbitrary shrink factors
- Independent horizontal/vertical zoom and shrink
- Enhanced and adaptive scaling algorithm for higher and optimal image quality

♦ **Built-in PLLs**
- Fully programmable timing parameters

♦ **YUV input port**
- 16-bit YUV input video up to HDTV 1920x1080i
- Seamless connection to video capture devices
- Built-in YUV to RGB color space converter

♦ **RGB inputs**
- Supports SXGA at 60Hz (108MHz operation)
  - Single pixel (24-bit RGB)
- Up to UXGA 75Hz (101MHz operation)
  - Dual pixel (48-bit RGB) at half clock
- Programmable input port timing

♦ **Auto Configuration** of image position and clock phase

♦ **Auto Detection** of input formats

♦ **Output Pixel Modes**
- Single or double wide output interface (24/48-bit RGB or 16/32-bit YUV)
- Single pixel (24-bit RGB) up to SXGA 75Hz
- Dual pixel (48-bit RGB) up to UXGA 60Hz
- Compliant with proposed VESA FPDI-2 std via direct connect to LVDS and TMDS transceivers

♦ **Frame Store Interface**
- Fully programmable 64/48/32-bit wide data path
- Optional data compression for flexibility and lower solution costs
- Supports up to 125 MHz SDRAM or SGRAM

♦ **Operating Modes**
- Frame rate conversion and image scaling
- Bypass of FRC (no frame buffering)
- Bypass mode with no filtering (up to UXGA 60Hz)
- 1:1 scaling with programmable smoothing
- Non-interlaced zoom
- De-interlaced zoom
- Horizontal and vertical image flip
- Display Synchronization Modes
  - Frame Sync, Line Sync and Free Run

♦ **Simplicity of design speeds time to market**
- Single-chip complete scaling solution
- On-chip OSD engine and support for external OSD for more flexibility
- Embedded micro-processor for fast, easy to use system implementation
- High-speed I²C interface for easy connection to external micro-controllers
- Most of the required on-chip clocks generated by a single external reference XTAL/oscillator
- Programmable Gamma CLUT with digital brightness and contrast control (to enable color calibration in digital monitors)
- Programmable horizontal and vertical front and back porches on input data
- Input active window region decoded
- Programmable HSYNC and VSYNC delay

PACKAGES

- **gmZ4X**: 256-pin PBGA for support up to XGA
- **gmZ4S**: 292-pin PBGA for support up to SXGA
- **gmZ4U**: 336-pin EBGA for support up to UXGA with dual 48-bit input bus

APPLICATIONS

- Multiple frequency LCD monitors for CRT replacement
- Projection systems (AMLCDs, DMDs)
- Other fixed-resolution pixelated display devices
- Home theater and video walls

Genesis Microchip

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Figure 1: gmZ4 Functional Block Diagram

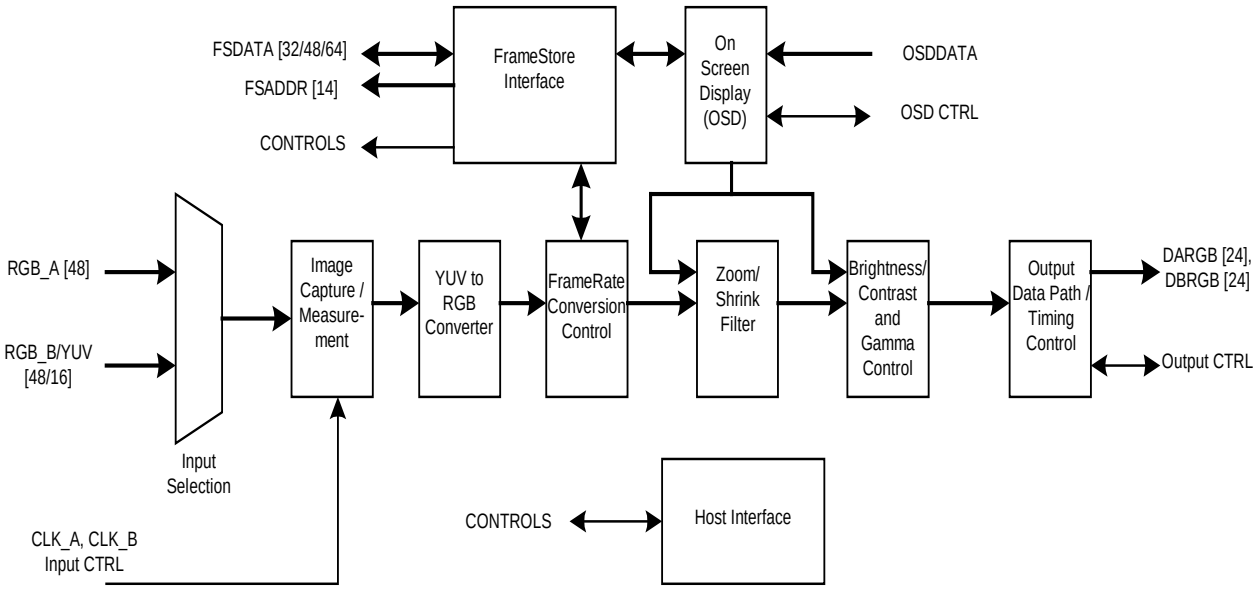

Figure 2: gmZ4-Based System Design Example