

## General Description

With Macronix's patented Smart-scaling™-3 filter, it provides high quality scaled video image and format conversion capability. The high-bandwidth design support up to UXGA/HDTV resolution and add the keystone correction function for projector application.

## Applications

- LCD monitors
- LCD projectors
- Plasma Displays/Projection TVs/LCD TVs
- HDTVs / Progressive Scan Direct View TV

## Features

- High-Bandwidth support up to UXGA/HDTV resolution..
- New Generation high quality scaling-SmartScaling™-3..
- Non-linear horizontal and vertical scaling for aspect ratio conversion (e.g.4:3 ⇔ 16:9.)
- Keystone correction for projector application.
- Advanced PIP(Picture In Picture ) / POP (Picture Out Picture) / PBP (Picture By Picture).

\* It supports the below application:

- (1) Video over video
- (2) Graphics window on video background
- (3) Video window on graphics background.

- Advanced Motion Adaptive De-Interlacing.
- Start-up screen function.
- Build-in OSD engine and support external OSD.

## Main-Channel Input Port

- Up to 1600 x1200 @85Hz and 1920 x 1080P@60Hz.
- Max. Pixel Rate: 230MPixels/sec.
- Support RGB888, YCbCr444,YCbCr422, YPbPr.

## Sub-Channel Input Port

- Up to 1280 x 1024 @60Hz and 1920 x 1080i @60Hz.
- Max Pixel Rate: 108MPixels/sec max.
- Support RGB888, YCbCr444, YCbCr422, YPbPr.

## Display Output Port

Model Name	Max. Output Resolution
MX88L285-U	1600x1200 @60Hz 1920x1080 @60Hz
MX88L285-S	1280X1024 @75Hz

\* Provide 18/24/30 bit, single/dual RGB output.

## Image Scaling

- High quality image scaling with SmartScaling™-3
- Independent horizontal and vertical scaling.
- Non-linear horizontal and vertical scaling for aspect ratio conversion. (e.g. 4:3 ⇔ 16:9)
- Keystone correction function for front-end projector.

## Image Processing

- Programmable Edge Enhancement Filters.
- Advance Motion Adaptive de-interlacing algorithm.
- Multi-Windows Processing : PIP / POP /PBP.

## Color Processing

- Support 4bit/2bit spatial & temporal dithering capability to make 18-bit video as good as 24-bit quality.
- Built-in Color space converter for video decoder input.
- Programmable 12-bit Gamma correction for panel compensation.
- Two set Brightness /Contrast /Hue /Saturation /Intensity adjustments.
- Support Color Management function to match sRGB Compliant requirement.

## Automatic Image Optimization

- Support Auto-tracking and Auto-position capabilities.
- Support odd/even field detection.
- Support H/V Sync. Polarity and pulse width information for mode detection

## On-Screen-Display

- Support OSD MUX capability for external OSD chip input.
- On chip ROM based Landscape and Portrait.
- Built-in 128 ROM fonts, and 128~256 programmable (Include MONO fonts and Color fonts) RAM fonts.
- True color OSD bitmap image is supported.
- On-Chip OSD is supported transparency mask.
- Build-in H/W Cursor.

### Frame buffer Interface

- Fully programmable 64/48/32-bit wide data path.
- Supports up to 166 MHz SDRAM or SGRAM.

### Microprocessor Interface

- Support two types of CPU interface. (Direct /Serial bus)
- Support CPU line write/read and flush screen capability.

### Package

- Package: 388-pin PBGA

### Power

- Power supplier: 2.5Volt/ 3.3 Volt power supplier.  
5Volt tolerant I/O.
- Power Consumption: less than 2 W.

### Others

- Support power down mode.
- Support GPIO pins to minimized the system cost.
- Support IR Decoder signal input.
- Support Inverse, delay adjustment and frequency adjustment for LCD panel clock (LCKA and LCKB)
- Testing pattern auto-loading to reduce manufacture cost.

### MX88L285 System Block

