

## Description

MB86276 'Lime' is a new extension to Fujitsu's graphics controller device family for 2D applications. The chip is based on the 'Coral' device family's core functions and is optimized for 2D applications. MB86276 'Lime' incorporates the display controller, rendering engine and video input unit from the successful MB86296 'Coral PA' device but the floating point co-processor and all 3D-functions have been removed. Furthermore, the CPU

interface has been optimized to offer additional CPU connections. Lime is 100% binary compatible to the 'Cremson' and 'Coral' family devices. All available OS drivers from the 'Coral' series can be used with MB86276 'Lime'.

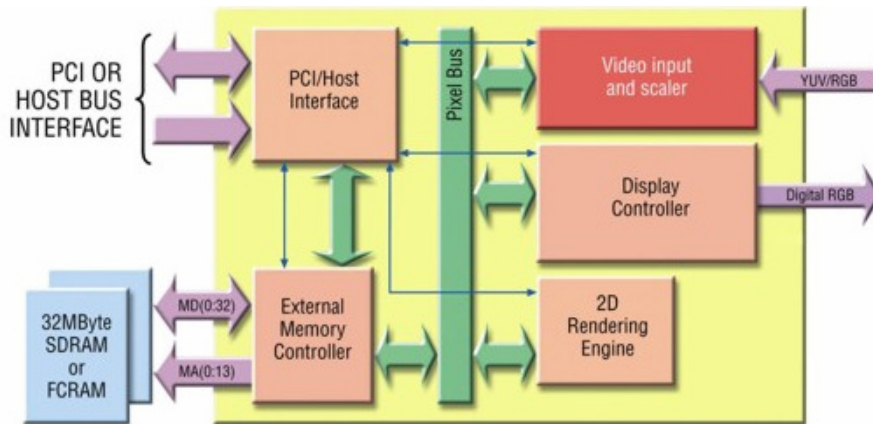
Six display layers can be used simultaneously. All layers can have a color depth of 8, 16 or 24 bits/pixel and their position, size and priority can be exchanged. The maximum logical layer size has been increased to 4096 x 4096 pixels. Using the alpha map, specific layers can be smoothly blended together. The alpha map can be freely assigned to any of the six layers and allows the assignment of 8 bits per pixel, enabling each pixel to be mixed in order to control transparency to a much more defined extent. In addition, all layers can be blended at a fixed ratio of 256 levels.

To enhance Bit BLT (Bit Block Transfer) operations, this feature can be combined with alpha mapping. With this function, any bitmap can be copied from any source location (CPU or video memory) and can be copied onto a layer with an independent alpha map. Software routines which make use of this function can greatly improve image quality (for example text anti-aliasing or objects to be placed in front of a moving background).

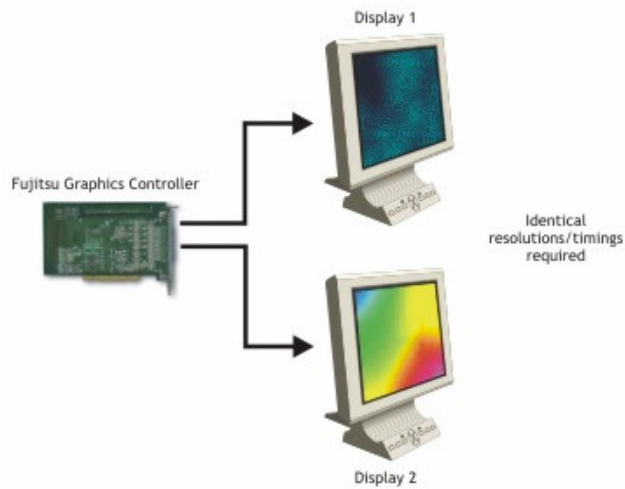
MB86276 'Lime's external video input accepts data that is compliant to the following standards: RBT-ITU656, RBT-ITU601 and RGB666. This allows video signals from various sources to be displayed together with generated graphics. The video input unit is capable of accepting PAL or NTSC video format signals from TV tuners, DVD players or cameras. In addition, rendered graphics from any other graphics display controller can be used as an RGB input source. Incoming video signals can be freely scaled in any direction (up or down) to be displayed as picture-in-picture or as a full screen layer. Contrast, brightness and saturation controls are implemented to be able to adjust incoming camera signals. Video pictures of any format can be read from the capture buffer to make them available for graphics post-processing or to be read out by the connected host processor.

One of MB86276 'Lime's unique features is its dual display mode capability. The device can simultaneously drive two individual displays that are connected. The displays must have the same resolution, scan rate and identical sync signals and can be attached to the Lime in either dual or multiplexed mode. This functionality makes it possible to realize all kinds of dual display applications, such as rear-seat entertainment systems or dual monitor control units. In dual display mode, each layer can be programmed to appear on display 1, display 2 or on both. This functionality makes it possible to duplicate contents (such as a video picture) but also to have two individual pictures on the two displays.





MB86276 'Lime' Block Diagram



MB86276 'Lime' Dual Display

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## **Key Features**

- CMOS 0.18µm technology
- Display resolutions up to 1280x768
- 6 layers of overlay display (windows)
- Alpha Plane
- Digital Video input (various formats)
- Video Scaler (up/down scaling)
- I2C interface
- RGB digital output (8bit x 3)
- Includes various kinds of 2D graphic acceleration functions
- Built-in alpha blending, anti-aliasing and chroma-keying
- External 32-bit 133MHz SDRAM/FCRAM interface for up to 64MB graphic memory
- Host interface 32/16 bit
- GPIO inputs/outputs
- Serial interface
- Supply voltage 3.3V (I/O), 1.8V (Internal)
- BGA-320 Package
- Temperature range -40 to +85 °C

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## **GDC Ordering Information**

### **MB86276 'Lime' Graphic Display Controller**

Ordering part number (standard package): MB86276PB-ES

Ordering part number (lead-free package): MB86276PB-GS-ZE1

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