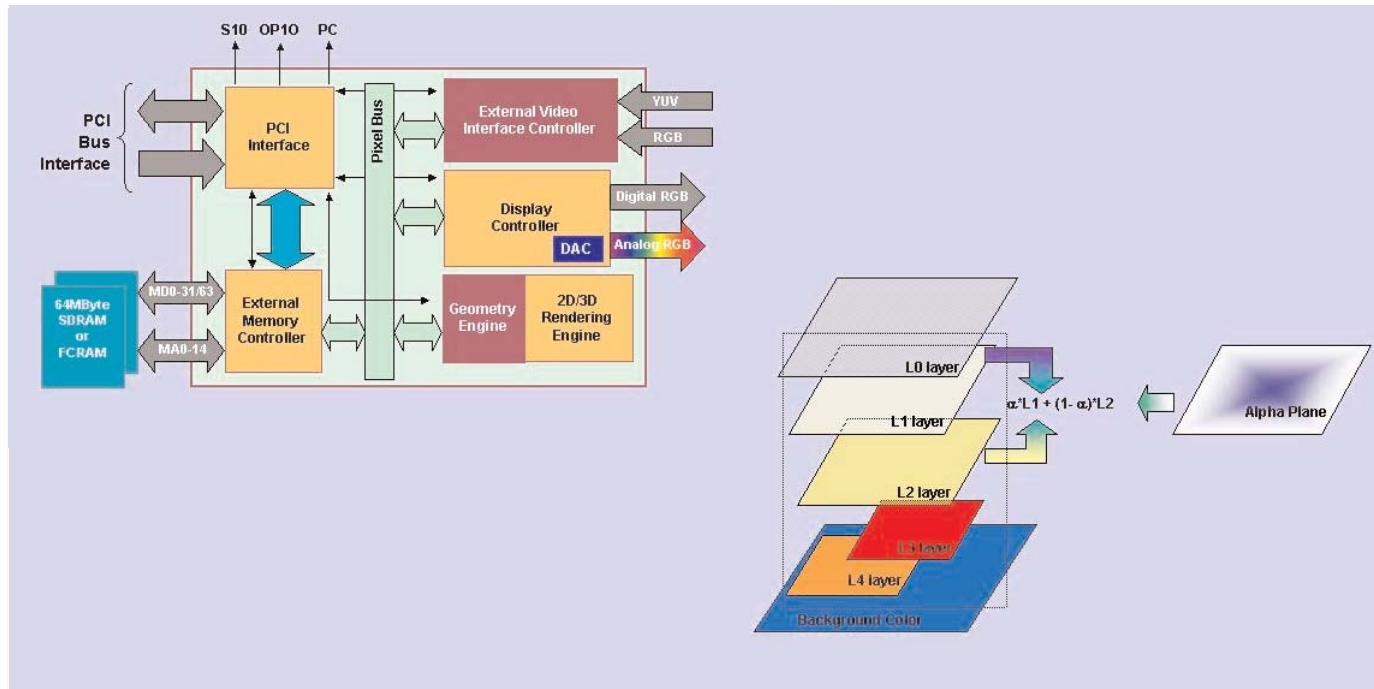


# Graphic Display Controller

MB86296 Coral PA



## Description

The new Fujitsu MB86296 Coral PA is an enhanced version of the MB86295 Coral P with several new features to address high-end graphics applications in embedded automotive and industrial applications. A new PCI host interface allows higher bandwidth transfers between the host CPU and the MB86296 Coral PA. The new dual-buffer architecture of the MB86296 nearly doubles the PCI transfer rate compared with the previous device. Any CPU with a 32-bit PCI V2.1-compliant host interface clocked at 33MHz can be directly connected to Coral PA (in peer-to-peer mode, 66MHz is also possible). The device includes both master and slave functions and an internal DMA controller for multi-burst transfers of large volumes of data between all combinations of PCI data space and Coral internal areas. Besides the host interface, this device also has the general-purpose IO pins and a serial interface for simple external resource control purposes. The new external video input of Coral PA accepts data conforming to standards such

as RBT-ITU656, RBT-ITU601 and native RGB666 and RGB888. This allows video signals of various sources to be displayed together with rendered graphics. Another improvement made to the MB86296 is that pixel-accurate RGB data can be captured and written to the internal buffer without undergoing conversion to YUV422. The video input is capable of accepting TV tuner, DVD player, or camera signals in PAL or NTSC video formats. In addition, rendered graphics from any other display controller can be used as a video-input source. The video-scaling function now allows any combinations of up- and down-scaling of pictures enabling picture-in-picture or full-screen mode of multimedia pictures at large resolutions to be displayed. Other new functions of Coral PA include a programmable pixel-clock output delay, an upgraded ROM for the geometry engine and an additional bus-clock mode for a direct 33MHz clock input from any PCI bus.

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Six display layers can be used simultaneously in Coral PA. All layers can have a color depth of 8, 16 or 24 bits/pixel and can be changed in position, size and priority. The maximum logical layer size has been increased to 4096 x 4096 pixels. Using the alpha map, specific layers can be blended smoothly 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 to control transparency to a much finer degree. In addition, all layers can be blended at a fixed ratio of 256 levels. One of the new features of Coral PA is the dual display mode that allows the device to drive two connected displays individually. The displays should have the same resolution and can be attached to the Coral PA in one of the following ways:

**Single Mode** - The chip outputs the same content in RGB analog and digital. **Dual Mode** - Two different displays are connected in RGB analog and digital. **Multiplexed Mode** - Two different displays can be connected via an external de-multiplexing logic (FPGA), which receives a multiplexed RGB digital stream from the MB86296 RGB digital output. With this method, a variety of dual-display applications such as rear-seat entertainment systems or dual-monitor control units can be implemented. In dual-display mode, each layer can be programmed to appear in display 1, 2 or both. It is also possible to duplicate content; (e.g., a video picture), and to have two individually composed pictures on the two displays.

## ► Features

- CMOS 0.18 $\mu$ m technology
- Display resolutions up to 1024 x 768
- Dual-display output capability
- 6 layers of overlay display (windows)
- Alpha plane
- Digital video input (various formats including native RGB)
- Video scaler (up/down scaling)
- Brightness, contrast and saturation control
- I2C interface
- Geometry processor
- RGB digital output (8bit x 3)
- RGB analog output
- Various kinds of 2D/3D graphic acceleration functions
- Built-in alpha blending, anti-aliasing and chroma-keying
- PCI 32-bit V2.1 host interface with enhanced bandwidth
- External SDRAM or FCRAM interface at 133MHz for up to 64MB graphic memory
- GPIO inputs/outputs
- Serial interface
- Supply voltage 3.3V (I/O), 1.8V (internal)
- BGA-256 package
- Temperature range -40 +85 °C



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