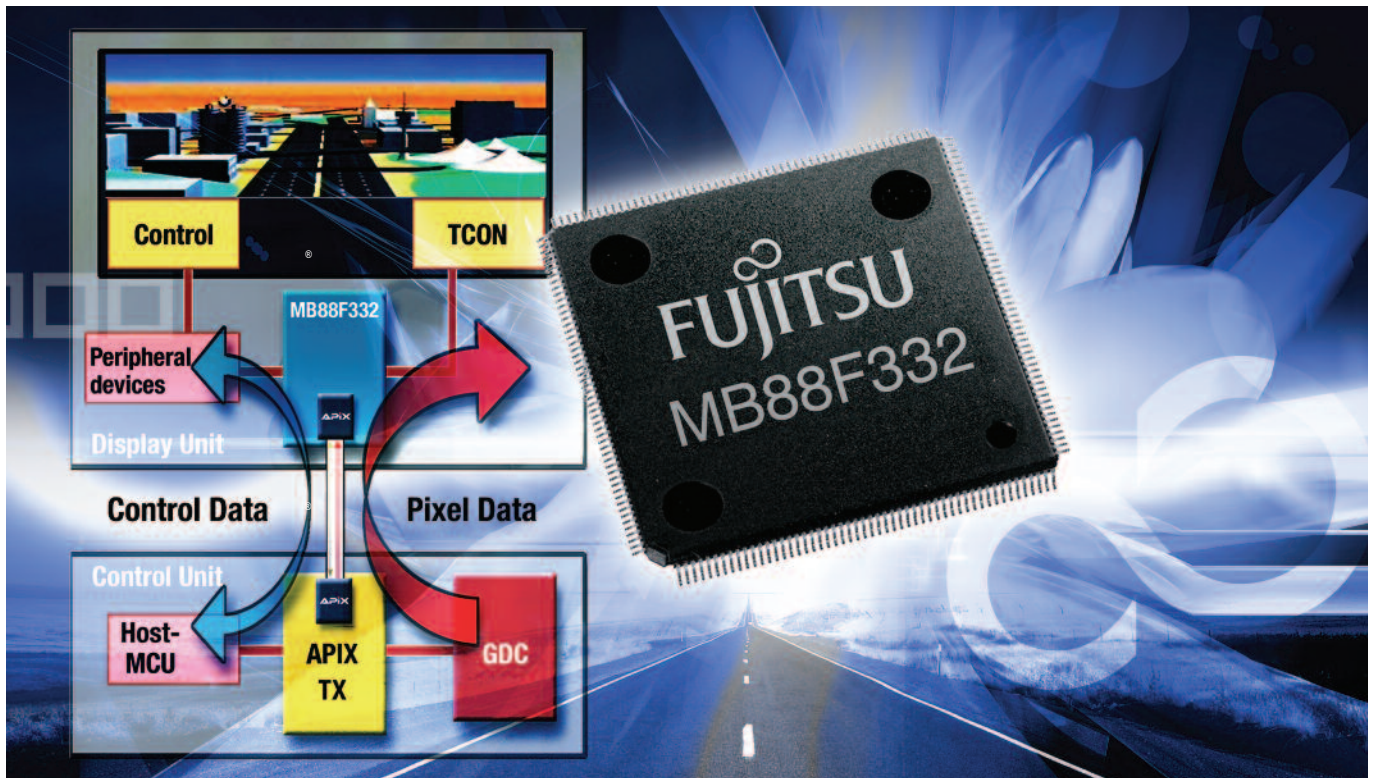# FUJITSU

MB88F332 - Single-chip solution delivers sophisticated graphics and cost savings

Display system architecture

Description

The MB88F332, Fujitsu's new graphics controller opens-up new avenues for concept designers of graphics systems. Developed to meet the requirements of in-car applications such as hybrid cluster, RSE (rear-seat entertainment), HUD (head-up-display) and CID (central information display) in future vehicle generations, it provides a big potential for reducing system costs.

In a modularised system the MB88F332 is installed close to the screen without external memory and external TCON, and can start up stand-alone up to a splash-screen

display. The state-of-the-art APIX® interface builds the serial video and command link to a remote control unit. The pixels are made by the internal sprite engine in an animated style, blending and overlaying internal sprites and external video data. With further peripherals such as ADC, I^2C, SMC and GPIO, etc., to round-off the feature list, the MB88F332 is packaged into a low cost QFP.
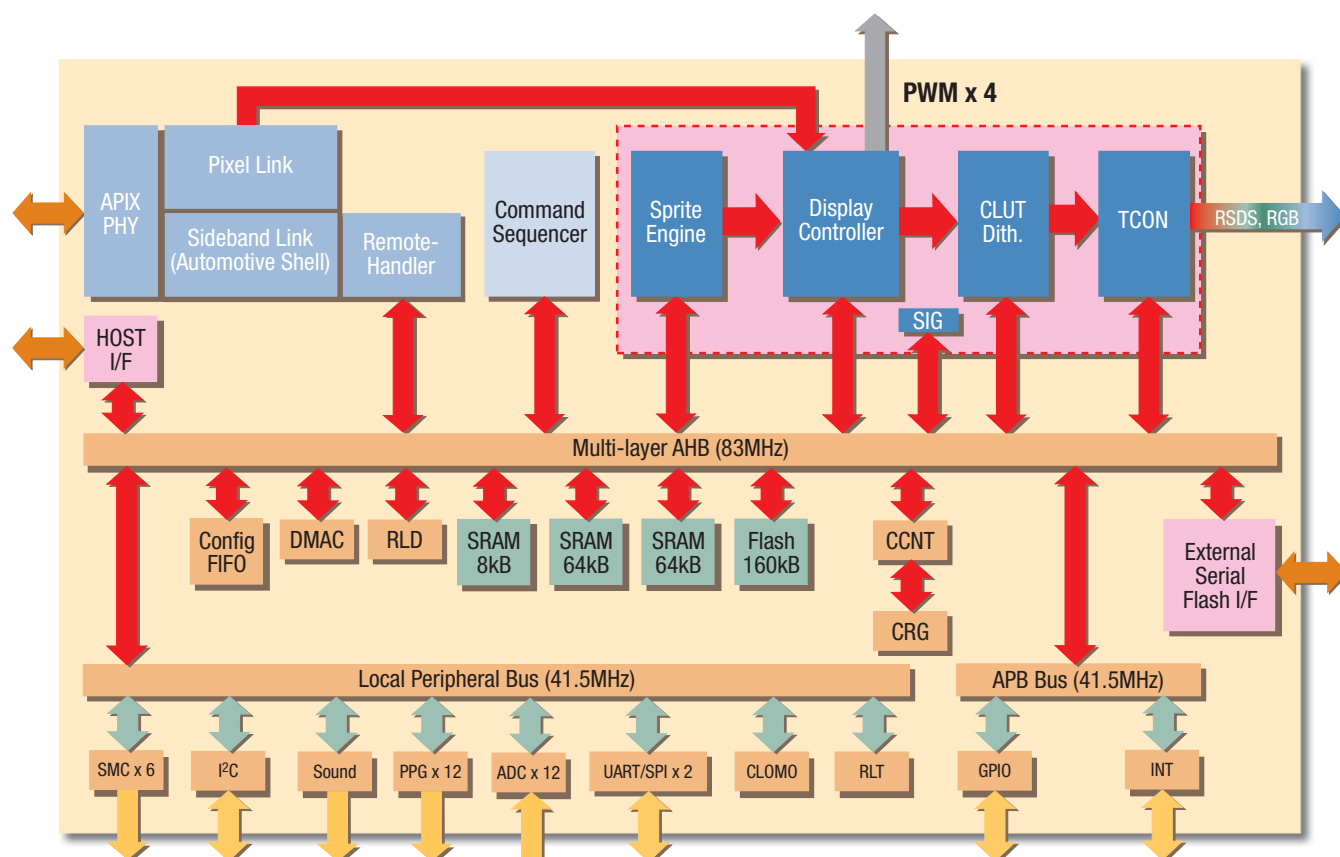
Features
- 80MHz system clock
- CPU interface: synchronous serial peripheral interface (SPI) or APIX sideband link
- 160kB embedded NOR-flash ROM

- 128kB + 8kB embedded SRAM
- External video synchronisation functionality
- Seamless direct connection to displays using TCON
- Spread Spectrum clock modulation (for improved EMI ratings)
- Signature calculation function, required for Automotive Safety Integration Level (ASIL)
- Data expansion for run length encoded (RLE) data
- Dual channel DMA
- Sprite engine

MB88F332 Block Diagram

Graphics core

- 1, 2, 4, 8bpp (indirect, i.e. colour palettes) or 16bpp, 24bpp (direct) colour depth
- 4/8bpp alpha plane (256 level alpha blending)
- Linebuffer technology: no need for external VRAM
- Maximum display resolution supported: 1280 x 480 (max. 42MHz pixel clock)
- 18bpp TFT LCD panel (RSDS or TTL)
- Dither and gamma unit (CLUT)
- Sprite technology:
  - Up to 512 sprites (including
  - 32 special sprites)
  - Special sprites for blinking, movement and image switching, with priority property
  - Automatically animated sprites (command-list-based special sprite functions)
  - Horizontal reverse feature
  - Support for alpha blending

Peripherals

- SPI for connection to external SPI flash
- APIX Rx interface (pixel link and sideband link)
- MCU peripherals:
  - 6 stepper motor controller
  - 16PPGs (PWMs)
  - 12-channel ADC
  - I²C
  - 2-channel SPI/UART
  - Sound generator module
  - GPIOs
  - External interrupt input 4-channel x 2
  - Watchdog

General information

- CMOS 180nm flash technology
- Supply voltage 3.3V (I/O), 5.0V (I/O MCU peripherals), 1.8V (internal)
- Low-cost QFP package
- Extended temperature range -40 to +105°C

APIX® interface: http://www.inova-semiconductors.de/en/products_01.htm

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