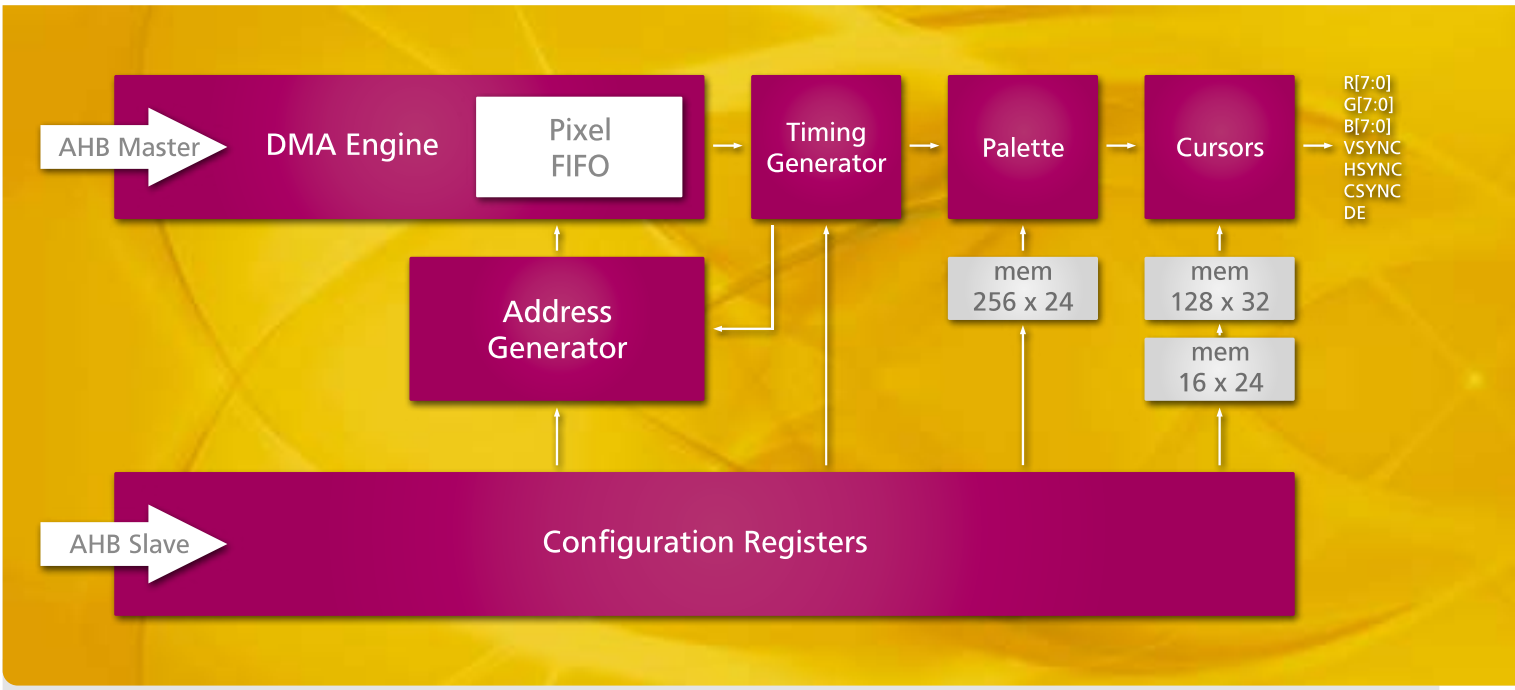
Think Silicon

Think LCD

VGA LCD Controller



Mobile Graphics Solutions

Overview

The ThinkLCD Display controller is an AMBA AHB module that can drive a VGA or LCD screen in a SoC. It can be easily programmed with X11 Modeline timing to support any required resolution in any step.

32,16 and 8 bit colour modes are supported as well as an arbitrary number of hardware overlay cursors/sprites.

Features

- 32-bit pixel fetching DMA with burst support
- Register File
- AMBA bus standard
- Configurable Pixel FIFO size (64x32/128x32/256x32/512x32)
- Resolutions from 1x1 up to 32768x32768 (including 640x480, 800x600, 1024x768, 1280x1042, 1600x1200 etc) in any step
- Configurable Stride/Pitch that allows Panning/Scrolling
- RGBX8888, XRGBR8888 (32-bit)
- RGBX5551, RGB565 (16-bit)
- RGB232, LUT8, Grayscale (8-bit)
- 8-bit palette (optional-requires a 256x24 memory)
- Gamma Correction
- Fixed Cursor (optional)
- Programmable 32x32 Cursors (optional-requires 128x32,16x24 CLUT memory)
- Scaling, Dithering
- Alternating Base Addresses support for each frame, 3D Stereo
- Programmable HSYNC, VSYNC, DE Polarity
- HSYNC, VSYNC, CSYNC, DE, Parallel RGB, Serial RGB
- Interrupt Request (IRQ) support on HSYNC/VSYNC
- Linux Framebuffer Kernel Drivers
- Can be customised to user requirements (i.e. Deep Colour etc)

Think LCD VGA LCD Controller

Core	Think LCD	Think LCD / ML
Resolution	any*	any*
8 bit Palette mode	✓	✓
8 bit Grayscale	✓	✓
8 bit mode (332)	✓	✓
16 bit modes (565, 555, 444)	✓	✓
24 / 32 bit modes (888)	✓	✓
HSYNC, VSYNC	✓	✓
Separate CSYNC	✓	✓
Data Enable (DE)	✓	✓
Programmable polarity	✓	✓
IRQ on HSYNC / VSYNC	✓	✓
3D Stereo support	✓	✓
Dithering	✓	✓
Parallel RGB888/666 output	✓	✓
Serial 3 RGB888/666	✓	✓
Serial 4 RGBX8888/6666	✓	✓
Panning/Scrolling support	✓	✓
Configurable Endianness	O	O
Gamma Correction	✓	✓
Fixed overlay cursor	O	O
Programmable cursor	O	O
Scaling	-	✓
AHB Master DMA I/f	✓	✓
AXI Master DMA I/f	optional	optional
Multiple Layers	-	✓
Synthesizable	✓	✓
Linux Kernel Drivers	✓	✓
Available	now	now

✓ Standard feature, O Design Time option, - Not Available, * up to 32768 x 32768

Applications

- PDA (Personal Data Assistants)
- Mobile Phones
- GPS Navigators
- InCar Information/Entertainment
- Game Machines
- Remote Display Boards

Benefits

- Standard bus interface
- Integrated DMA pixel fetching
- Fully Programmable operation
- Modular/Configurable design
- 8-bit Palette
- Fixed Cursors
- Programmable Cursors
- Double Frame buffering
- Parallel/Serial RGB
- Panning support
- Linux drivers

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