



VLSI Technology, Inc.

VY86C7500 32-Bit RISC Single-Chip Multimedia Computing

Overview

VY86C7500 is a highly integrated single-chip RISC computer. Based around a cached ARM7 32-bit core, it has memory and I/O controllers, 3 DMA channels and 2 stereo sound ports. The on-chip video controller, which includes a color palette, can directly drive either a CRT or LCD display.

These features are coupled with the low-power consumption and small die size that ARM processors always offer to provide a cost effective solution for multimedia computing applications.

Video and Sound Macrocell

The video and sound macrocell gives the VY86C7500 the flexibility to drive monochrome single- or dual-panel LCDs and can also be used to drive color LCD panels.

The video and sound macrocell has two sound systems built into it. These are an 8-bit analog stereo system, and a 32-bit serial

sound interface suitable for driving external CD DACs.

Clock Control and Power Management

The clocking strategy for VY86C7500 has been designed for maximum flexibility. It includes separate clock inputs for the CPU core clock, the memory system clock and the I/O system clock (in addition to the video clock inputs). Each of the three clock inputs has a selectable divide-by-two prescaler to generate a 50/50 mark-space ratio if required.

There are two levels of power management included: SUSPEND mode and STOP mode.

Memory System

The memory system interface control logic is designed to be completely asynchronous in operation to the I/O control logic. This means that the clock to the memory controller can be increased in frequency to allow fast memory to be used.

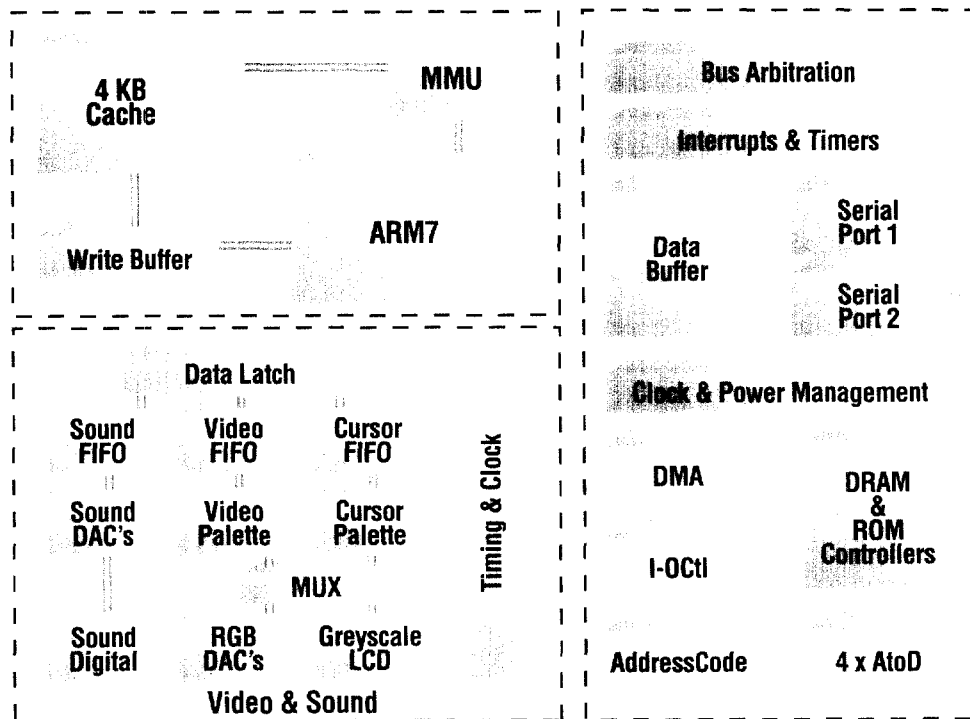
The converse is also true—the clock can be slowed down for slow memory. This ensures maximum system flexibility and allows the system designer to use available memory without having to alter any interface timing.

I/O Control

The I/O bus of VY86C7500 is 16 bits wide, but can be expanded to 32 bits by the use of external transceivers. The input clock, I/OCLK, provides a reference for the subsystem which is nominally 32MHz.

There are three distinct I/O cycle types:

- Simple I/O with fixed 8MHz timings
- Module I/O with variable length 8MHz timings
- PC bus style I/O with fixed 16MHz timings and support for 32-bit data



VLSI5040



VLSI Technology, Inc.
 8375 S. River Parkway
 Tempe, AZ 85284
 Tel: 602 752-8574
 Fax: 602 752-6014

**computing
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Applications

Power management circuitry coupled with the power efficient characteristics of the ARM processor macrocell makes the ARM7500 particularly suitable for low power portable applications. 32-bit and 16-bit wide memory systems are supported. This allows a high performance 32-bit system or a lower cost 16-bit system to be designed.

ARM's low power design means that VY86C7500 solves both battery life problems in portable equipment, and fan/heat-sink issues in AC-powered applications.

On-chip sound and video processing integrated with a high-speed RISC core makes VY86C7500 an ideal solution for cost-sensitive multimedia applications.

These features make VY86C7500 particularly suitable for:

- Internet appliances
- Network computers
- Set-top boxes and interactive television
- Portable computers
- Games machines
- Advanced portable digital instruments
- Mobile point-of-sale terminals

Features

- Highly integrated RISC computer
- 30 Dhrystone 2.1 MIPS ARM7 core at 33MHz
- 4 KByte combined instruction & data cache
- Flexible memory management unit
- Supports 16 or 32 bit wide memory via ROM and DRAM controllers
- 3 channel DMA
- I/O controller
- 2 serial ports, 4 A/D channels
- 8 stereo sound channels
- 32-bit CD-quality serial sound channel
- Video controller with up to 120 MHz pixel clock

- 16 million colors from a 256-entry palette
- 16-level grey scales for LCD displays
- Suspend and stop power saving modes

Other Features

ARM7500 includes; four slope integration, A to D converter channels, and two serial keyboard/mouse ports. There are 8 general purpose open-drain I/O lines which can be used as inputs or open-drain outputs and as interrupt sources if required.

Specifications

Technology	0.6µm CMOS
Clock Frequency	33MHz
Package	240 pin PQFP
Voltage	5V
Power Consumption	
with CRT display	1W(typ)
with LCD display	0.5W(typ)
MIPS (Dhrystone 2.1)@5V, 33MHz	30
Cache	4KByte
Write Buffers	8 word
	4 address

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