



Tech Info Library

Macintosh AV Series: Custom Integrated Circuits (12/93)

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TOPIC -----

The Macintosh AV Series of computers* use several new custom Integrated Circuits (ICs). Some of these ICs are grouped to form different subsystems that operate independently within the system. These ICs are:

DISCUSSION -----

(* The Macintosh AV Series includes the following models:
Macintosh Centris 660AV, Quadra 660AV and Quadra 840AV.)

Digital Signal Processor (DSP)

A separate 32-bit floating point processor used to perform fast, complex real-time data processing tasks such as speech recognition, audio compression, and analog modem signal processing. The DSP contains its own 8KB of internal RAM to minimize its use of system memory.

Memory Controller and Arbiter (MCA)

Supports the bus interface between RAM and ROM memory and the main processor, DSP, MUNI, and PSC; controls access to eight banks of DRAM; controls access to ROM; performs arbitration for control of the CPU bus between the main processor, PSC, MUNI, and DSP; and furnishes the bus time-out signals for the main processor, I/O, MUNI, and DSP buses.

Peripheral Subsystem Controller (PSC)

Provides nine dedicated DMA channels, decodes the I/O memory mapping, handles all internal system interrupts, handles VIA interrupts, and contains the buffers used for sound data to and from the Singer sound encoder and decoder (CODEC).

Macintosh Universal NuBus Interface (MUNI)

Supports the full range of NuBus master/slave transactions with single or block moves, including dumps and runs in which the main processor is master and the NuBus is slave, supports faster data transfer rates to and from the CPU bus, and supports NuBus '90 data transfers between cards at a clock

rate of 20 MHz. NOTE: the MUNI is located on the main logic board in the Quadra 840AV and on the optional NuBus adapter card for the Centris 660AV.

Cyclone Integrated Video Interfaces Controller (CIVIC)

Manages VRAM; controls data transfer between VRAM, the VDC and Sebastian; provides 32-bit or 64-bit data paths between VRAM and the main processor or a slot card; performs convolution; provides needed video timing signals; and generates the vertical blanking and video-in interrupt signals.

Sebastian

A video color palette and video digital-to-analog converter (DAC). It accepts up to 64 bits of digital input, either as one 64-bit port or as two 32-bit ports. Lets one 32-bit port handle digital video while the other processes graphics using the same or different color lookup tables. Supports mixing video with still graphics, uses a convolution filter to minimize flicker in line-interlaced displays, and supports displays with clock speeds up to 100 MHz.

Video Data Path Chip (VDC)

Performs input video window scaling with horizontal and vertical filtering, accepts YUV 4:2:2 color-encoded input from the Digital Multistandard Decoder or the DAV slot card bus, and produces 16-bit 1:5:5:5 RGB, 8-bit grayscale, or YUV 4:2:2 output.

Mickey

Accepts analog video signals from Sebastian, provides the encoding to NTSC or PAL digital formats, and produces S-video, composite, and RGB video outputs.

New Age

A floppy disk controller that controls the Apple SuperDrive at all of its recording densities, provides MFM and GCR recording formats, supports full asynchronous operation for DMA, and generates an interrupt on disk insertion. NOTE: in previous Macintosh models system software was required to poll floppy drives at frequent intervals to determine if a disk had been inserted, this is no longer necessary.

Curio

A multipurpose I/O chip that contains a media access controller for Ethernet, a SCSI controller, and the Serial Communications Controller (SCC).

Apple Telecom External Clock Synchronizer (ATECS)

Provides the control functions that synchronize the DSP and sound subsystems to an external clock signal received through the Apple GeoPort. In the absence of an external clock, it generates crystal-controlled

timing signals.

Cuda

Manages system resets from various commands, turns system power on and off, maintains parameter RAM, manages the ADB, manages the real-time clock, and lets an external signal received through the Apple GeoPort control system power.

Singer

An I/O chip that constitutes a 16-bit digital sound CODEC, conforms to the IT&T ASCO 2300 Audio- Stereo CODEC Spec.

Endeavor

A programmable video clock chip.

Digital Multistandard Decoder

Decodes the color information in NTSC, PAL, and SECAM video formats using a clock synchronized to their line frequency.

Note: Many of these Integrated Circuits are described in more detail in other Tech Info Library articles.

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14 December 1993 - Retitled article and revised topic to reflect entire AV Series.

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