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Macintosh Quadra 900 & 950: Sound Specifications

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TOPIC -----

The following provides an explanation of the Macintosh Quadra 900 & 950 sound specification.

DISCUSSION -----

Audio Line In Connectors

The Audio Line In connectors are standard phono connectors, intended for users who wish to use the computer to sample line-level devices such as home stereo systems. The signals from the Line-In connectors are internally mixed to a single (monophonic) audio signal; that is combined with the input from the Mic In connector and then sent to the sound input circuit.

Note: Even though there are two Line-In connectors, the stereo channels are mixed into a single monophonic signal; therefore stereo information is lost. For the user's convenience, the computer has two connectors so that an external mixer is not needed when connecting the computer to the most common type of consumer audio equipment

Sound Out Connector and Speaker

The Sound Out connector on the Quadra 900 computer is similar to the one on the Macintosh II and has the same electrical characteristics. The audio amplifier for the internal speaker is more powerful than those on other models so that it can drive the speaker at higher sound levels (approximately 2 watts per channel, compared to .25 watts per channel on the Macintosh II). The higher levels are required because the computer is normally on the floor and thus farther from the user.

The Quadra 950 computer uses a new sound system with features similar to those of the sound interface in the Macintosh LC and IIsi. The features of the Quadra 950 sound interface include:

- ASC compatibility
- Ability to play 8-bit sound files
- Lower noise and distortion analog circuitry

Four Apple custom ICs provide the sound interface:

- DFAC, which provides sound input and an anti-aliasing filter
- Batman, an updated version of the Apple Sound Chip
- Sporty, a custom IC that replaces the two Sony sound ICs
- External digital-to-analog converter (DAC)

The Digitally Filtered Audio Chip (DFAC) is an Apple custom IC that is also used in the Macintosh LC. The DFAC IC includes the anti-aliasing filter and analog-to-digital converter (ADC) for sound input. It also contains a digital filter for conditioning output data before it is sent to the DAC. The DFAC serializes the sound input information and sends it to Batman, where it is put into a FIFO which software can read.

The Batman sound chip provides ASC compatibility and includes several important new features such as support for sound input, support for an external D/A converter, and large FIFOs which buffer playback and sound input samples. Batman does not support the wave table function which was available in the original ASC (this features was not widely used and should only cause very limited compatibility problems). The Batman transfer acknowledge is generated by Relayer.

For sound output, an external DAC provides higher-quality sound than that generated by the PWM system used in earlier Macintosh models. The Sporty custom IC replaces the two Sony ICs used in earlier models and provides better sound quality (that is, less noise and distortion). Like the Sony ICs it replaces, the Sporty IC also contains digital attenuators. A separate amplifier with power output of 2 watts drives the larger speaker used in the Quadra 900/950 computer.
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