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# Macintosh II PC 5.25 Floppy Disk Controller Card: Description

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Security: Everyone

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The Floppy Controller card is capable of interfacing up to 4 drives, although the cable limits the actual connection of only one drive. User installable with instructions in the Apple PC 5.25 " Drive Users Guide, the card interfaces the Apple PC 5.25" Drive to the Macintosh II through any of the slots on the Macintosh II motherboard.

Through software, you can select two recording formats: IBM 3740 Single Density Format and IBM System 34 Double Density Format. The controller allows for multi-sector transfer capability; up to 3 sectors can be read/written in one read/write operation.

Full IBM PC/AT data format compatibility allows the IBM PC/AT to read disks formatted and written by the Macintosh II. The Macintosh II is also able to read data files created on the IBM PC/AT, but the controller does not give the Macintosh II the ability to run programs written for the IBM PC/AT.

Key Components

Address/Data Bus Transceivers: These 74LS640's buffer the internal address/data bus of the controller from the Nubus address/data bus.

AddressCounters: These 74LS169 counters latch the RAM/ROM address from the Nubus during RAM/ROM reads or writes and count down the RAM address during DMA transfers to or from the disk.

RAM: This is the 2048 x 8 sector buffer RAM. Data to be transferred to or from the disk is placed here by the CPU before such transfers are initiated.

ROM: This is the Nubus configuration ROM. The Nubus slot manager accesses this ROM on power-up to determine the controller's type and modes of access.

Slot Address Decoder PAL: The Pal20L10 determines if the controller's slot address is selected. It uses the signal START* and address decoding to compare if the upper nibble of the address is an x'F and if the address lines A[24-27]/D[0-3]* compare with the hard wired slot ID address.

State Machine PAL: This PAL20X10 generates the timing for programmed I/O and internal DMA transfers on the controller.

State Decoder PAL: The state number is decoded by this PAL to produce control signals needed by the various parts of the controller.

Control/Status Driver: The control driver places the signals ACK*, TMO* and TM1* on the Nubus at the end of a Nubus access of the controller. The status driver allows the signals,disk controller intertupt, internal operation pending, and disk in place to be read by the CPU.

NEC 765A Floppy Disk Controller IC: This LSI chip contains the circuitry necessary to interface to the Apple PC 5.25" Drive. Coupled with the companion NEC 9201 chip, it handles all operations with the drive including read and write data, formatting, seeking, sensing drive status, and recalibrating.

NEC 9201 Floppy Disk Interface IC: This chip provides drive and timing support to the NEC 765A IC. It contains write precompensation and phase-locked loop circuitry.

Disk Interface Driver: The disk interface driver buffers and provides current drive for several signals coming from and going to the disk. It also is used as a multiplexer for four signals: FLT/TRO, WP/TS, FR/STP, and LCT/DIR.

16 MHz Crystal Clock Oscillator:  This oscillator provides a 16 MHz clock to the NEC 9201 for use in the drive interface.

Nubus Interface Logic

The controller interfaces to Nubus via several drivers and PAL's. The address/data bus is tied to four 74LS640 transceivers which invert each bit. Control signals such as START*, the slot identification bits ID[0-3]*, and the mode bits TM[0-1] are used to time data transfers to and from Nubus.

Status information is passed to Nubus along with the control signal ACK* by the status driver using Programmed I/O operations. DMA operations are controlled by the state machine and state machine decoder PAL's. All data transfer operations are initiated and controlled internally.

Connectors/Cables/Pinouts

Controller Card to Drive: A cable composed of a 37 pin male connector on one end and a 34 pin edge connector and 4 pin DC connector on the other. A 20 pin cable makes the interconnection. Pinouts for the 37 pin, 34 pin, and 4 pin connectors correspond to the pinouts of the Apple PC 5.25" Drive.

Power Requirements:

Operating Voltages:

+ 5V  +/- 5%
+12V  +/-10%

Maximum Ripple:

@ + 5V  50 mV peak to peak
@ +12V  100 mV peak to peak

Operating Current (Apple PC 5.25" Drive Attached):

@ + 5V  3.3A (max)/1.9A (typ)
@ +12V  0.9A (max)/0.25A (typ)

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