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Macintosh IIfx: Burst-Mode Access and Page Mode Writes

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TOPIC -----

This articles describes burst-mode memory access and Page Mode Writes as implemented on the Macintosh IIfx.

DISCUSSION -----

Burst-mode Memory Access

The Macintosh IIfx, like the Macintosh IIci, supports burst-mode memory access. However, the Macintosh IIfx support burst access for reads and Page Mode Writes, while the IIci only supported burst reads. The FMC gives the Macintosh IIfx the ability to support burst-mode access. This enables the CPU to read and write groups of data in fewer clock cycles.

On the Macintosh IIfx, burst-mode reads are only done when the data is not located in the internal 256 byte and 32K Static RAM Cache. When the Macintosh IIfx reads from memory, the first access takes 6 clock cycles. The next 3 reads are performed at 3 clock cycles each. This is referred to as "6 3 3 3 burst reads."

Burst-mode access must be supported by the RAM as well as the memory controller. When memory is accessed, we use RAS (Row Address Selection) before CAS (Column Address Selection) to address the chip. We select the row of data we wish to access with a RAS, then assert the CAS lines to select the correct data column. It takes about 3 clock cycles for the chip to select RAS and 3 more cycles to address CAS before the data is ready to read or write.

When burst-mode is enabled, the RAS lines are held high until the burst cycle is over. The memory controller only has to change the column address (CAS) line to access the next bit of data in that row. It continues to change the CAS line until the burst cycle is over. Because the system does not have to readdress the RAS line, 3 cycles each read/write, it saves 9 clock cycles.

Page Mode Write

A Page Mode Write is similar to a burst-mode read. When data is written out, the system uses Latch Writes for the first write. If the instruction is also a write and the address is within the same page of memory as the previous write, Page Mode Write is used. Page Mode Writes keep the RAS line held high in the save "page" of memory.

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