Selecting an 83 MHz System Board for the IBM 6x86MX™ Microprocessor

Overview

This application note discusses selection considerations for 83 MHz system boards used with the IBM 6x86MX™ Microprocessor operating at an 83 MHz bus frequency.

Introduction

To improve the performance of personal computers, PC designers have traditionally used microprocessors with faster core speeds. However, to meet today's performance requirements, PC designers are also increasing system bus speeds.

In 1996, IBM introduced the 6x86™ Microprocessor running at bus speeds of 66 and 75 MHz. IBM continues this trend with the 6x86MX Microprocessor, which runs at 83 MHz.

Functional Support

The 6x86MX Microprocessor supports the functions provided by many of today's 83 MHz system boards:

- Universal Serial Bus (USB) interface

- Ultra-33 IDE Bus Master for 33 MB/sec access to CD ROM and hard disk

- Multi-I/O for improved handling of serial ports, parallel ports, and floppy disks

- ACPI for OS-directed power management

- 33 MHz PCI 2.1 interface

- 66 MHz Accelerated Graphics Port (AGP) for video applications.

Memory

The 6x86MX Microprocessor works with system boards supporting SIMMs and DIMMs. A typical board has four 72-pin SIMM sockets and two 168-pin DIMM sockets for up to 384 MB of memory. SIMMs may contain single- or double-sided EDO (extended data out) or FPM (fast page mode) DRAM. DIMMs contain SDRAM (synchronous DRAM).

System boards normally require 70ns or faster EDO/FPM DRAM to meet 83 MHz timings. Usually 50 or 60ns DRAM is required to minimize burst wait states for maximum performance. On a typical sys-

tem board running at 83 MHz, the minimum wait states are:

- x-3-3-3 for FPM DRAM

- x-2-2-2 for EDO DRAM

- x-1-1-1 for SDRAM

Wait states vary from board to board and depend upon DRAM access time. Wait states can usually be controlled using the BIOS menu.

Most system boards contain an on-board L2 cache composed of 512 KB Pipelined Burst SRAM (6ns access SRAM, 12ns access Tag RAM). Future boards will support more than 1 MB SRAM.

More information on memory is available from the IBM Microelectronics web site at **http://www.chips.ibm.com/products/memory/.**

PCI and AGP Support

The PCI and AGP buses operate at 33 and 66 MHz, respectively, as derived from the 83 MHz system clock. Jumper settings, BIOS menu choices, or both are used to select asynchronous or pseudo-synchronous clock operation. Synchronous operation is not recommended as PCI and AGP bus speeds will exceed specifications.

In pseudo-synchronous operation the PCI bus runs at 2/5 of the 83 MHz CPU bus frequency, and the AGP bus at 4/5 of the 83 MHz CPU bus frequency.

Jumper Settings

In addition to setting up the PCI and AGP clocks, jumper settings control the CPU bus frequency, core/bus frequency ratio, and core voltage. Information on jumper settings is normally supplied with the system board documentation.

System Boards

A list of 83 MHz system boards and vendors who support the IBM 6x86MX Microprocessor is available at **http://www.chips.ibm.com/products/x86/ x86comp/l3mothmx83.html.**

Chipsets

Information on chipsets is available at **http://www.chips.ibm.com:80/products/x86/ x86comp/mothcomp/chipset.html.**

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