MM ONE The MM/1 FAQ : Part 1 - Background

Q. What is the MM/1?

- The MM/1 (Multi Media/1) used to be called the "CoCo 4" or the KMA (Kiss My Amiga). It's a computer designed and built as an upgrade path for Tandy Color Computer owners who enjoyed using OS-9 on the CoCo. To this end, K-Windows (grfdrv on the CoCo.) was ported to the MM/1 allowing much of the software written for OS-9 on the CoCo to be ported to the new machine. Kevin Pease designed the MM/1's hardware. Carl Krieder produced many of the device drivers. Kevin Darling rewrote the CoCo grfdrv window functions (now called windio) to the new machine. In 1990, Paul Ward founded IMS (Interactive Media Systems) to produce the MM/1, and deserves a lot of credit for producing the initial run of machines, and getting them into the hands of developers. Sadly, Paul's business failed, and he sold off the rights for the MM/1 to [Blackhawk Enterprises](#).

Q. What is the systems hardware?

- The MM/1 is composed of 2 boards a CPU Board, and an I/O Board. (The idea was that the MM/1 could be used as a development platform, and companies could buy CPU Board's for embedded applications.)

- The CPU Board contains: a Signetics 68070 CPU, a Signetics VSC68??? video system controller, a Brooktree Palette controller (allowing 256 color pictures out of a palette of 16.7 million colors.), 1 meg of memory, floppy disk controller, 2 serial ports (/t0 /t1), an IBM XT keyboard connector, and an i2c (i squared c - "Inter Integrated Circuit", aka "Access Bus") connector, and the main bus used to connect to the I/O Board.

- The I/O Board contains: 2-simm sockets (can hold 1 meg simms), a SCSI interface, 3 serial ports (/t2, /t3, /t4), 2 centronix parallel ports (/p, /p1). a CoCo-compatible joystick port. and stereo in/out sound port. (Note: when the MM/1 was designed, the specs for 4-meg simms weren't finalized. As a result the simm sockets could not accept 4-meg simms. This effected certain Macintosh computers as well as some PC clone machines, but unlike the Paul Ward's IMS, those companies could afford to make the necessary wiring changes on their boards. With a little bit of re-wiring, it is possible to add 4-meg simms to the sockets.) Details of the re-wiring will be included in the [hardware FAQ](#).

- The "8-meg backplane" was designed to replace the "MM/1 Minibus Board" which connects the CPU Board and the I/O Board together. The new 8-meg backplane has 2-simm sockets, which can hold two 1-meg or two 4-meg simms. All new MM/1's (from [BlackHawk](#)) are shipped with the 8-meg backplane, and do not have SIMM sockets on the I/O board. The PAL used to decode the memory on the 8-meg backplane will disable the 2 simm sockets on the I/O board. According to Kevin Pease, he can make a new PAL which will allow you to use the two simm sockets on the I/O board as well as the 8-meg backplane to get an 11-meg system).

Q. What is the MM/1a?

- The MM/1a is a CPU upgrade for the MM/1. It's a small daughter board which replaces the Signetics 68070 CPU with a Motorola 68340 Micro controller. The daughter board adds another serial port (/t5), but doesn't have the i2c port found in the 68070 processor. I don't know if there are firm benchmark numbers,

but the 68340 appears to doubles the CPU speed of the MM/1. In addition, the 68340 uses a motorola 68020 core, so software can access to a number of the 68020 instructions.

Q. Where can I purchase an MM/1? or an MM/1a?

The current manufacturer is:

Blackhawk Enterprises
P.O. Box 10552
Enid, OK 73706-0552
405-234-2347.
e-mail nimitz@delphi.com

But you may also contact a sales rep:

Warren Hrach
4369 Newport Av.
San Diego, CA 92107
(619) 221-8246 (voice)
(619) 224-4878 (Ocean Beach BBS)
e-mail: warren@ocnbeach.esnet.com

Q. What memory configurations are available?

- the 68070 has a limit of 14-megs of address space, so that has been the limiting factor for most memory configurations. The 68340 has a much larger address space (anyone know?), and *could* make more memory available in the future. To be honest, 3-megs is a very comfortable amount of memory. 9-megs is down-right roomy.

- Note: Configurations 3-6 (below) require changing a PAL on the I/O board. You'll need to contact Blackhawk Enterprises or one of the sales reps to get those parts.

    1. The CPU Board comes with 1 meg of RAM built in. (total 1 meg)
    2. The I/O Board can hold two 1-meg simms. (total 3 meg)
    3. The 8-meg Backplane with two 1-meg simms. (total 3 meg)
    4. The 8-meg Backplane with two 4-meg simms. (total 9 meg)
    5. * The I/O Board (kludged to accept 4-meg simms) (total 9 meg)
    6. * The 8-meg Backplane with 4-meg simms & kludge the I/O board to hold two 1-meg simms. (total 11 meg)
- * Details on these kludges may be included in the mm1.hardware faq assuming I find out what is needed.

Q. What Software comes with the MM/1?

- The MM/1 is shipped with Microware's Professional OS-9/68000 v.2.4 and includes Microware's C compiler, Basic-09 (a partially-compiled basic), umacs, the Odd-Job Script language, the K-windows multi-screen windowing environment, PCF (for accessing IBM-PC format disks), and a few programs for viewing GIF files, amiga Anim's, and Autodesk animator "Flicker" files, and playing sound files, a crude e-mail program, kermit, and a number of misc utilities programs too numerous to mention. (note: David Graham told me he also included Sub-Etha's Checkbook+, and Boisy Pitre's Linkup (terminal emulator) with all new machines purchased)
- see: mm1.software for a more complete list of free and commercial software available for the MM/1.

Q. What sort of manuals/reference material is available?

- The machine comes with varying levels of documentation. Owners of the MM/1 can get the Microware OS-9 Manuals from Blackhawk Enterprises (contact them for more information and pricing) For those of you still looking for information here are some books you can pick up at swap meets, or from some of the MM/1 Vendors:

  - CoCo 3 OS-9 Level 2 Manual. - good OS-9 reference, has many of the commands, and the system overview. Including some technical information about how OS-9. (Radio Shack Cat. No: 26-3031)

  - CoCo Multi-Vue Manual. - has good examples of k-windows programming in the programming section...including how to handle mice, and windows. (Radio Shack Catalog Number 26-3035)

  - Rainbow's Complete Rainbow Guide to OS-9 - by Dale Puckett and Peter Dibble. I love this as an introduction to OS-9. Lists many of the basic commands, and explains a lot about using OS-9. (ISBN: 0-932471-00-5) (Library of Congress Card Catalog Number 85-70113)

  - The Official Basic-09 Tour Guide - by Dale Puckett. I've never used Basic-09, but the version on the MM/1 is virtually identical to the coco version discussed in this book. (Radio Shack Cat. No. 26-3189) (ISBN: 0-918035-00-7). This book *MAY* still be available from Microware Systems Corp. General Publishing Department, 1866 N.W. 114 Street, Des Moines, IA 50322.

  - Farna Systems sells: "OS-9 Quick Reference and Programmers Guide for Professional OS-9" which briefly describes many of the OS-9 commands, as well as providing documentation on many of the OS-9 system calls.

  - Mike Sweet's - Windio_ref.ar (available on many BBS's) details many of the windio calls and display codes, as well as explaining a little about the keydrv (keyboard driver). This is in the process of being updated for windio 54 (contact David Graham of Blackhawk Enterprises.)

- and two books still being published:
  - The OS-9 Guru: 1 - The Facts - By Paul S. Dayan. (ISBN: 0-9519228-0-7) Published by Galactic Industrial Limited, Durham, UK. (Fax inside UK: 091-3847742) (Fax from Outside UK: +44 91-3847742)
  - OS-9 Insights: An Advanced Programmer's Guide to OS-9 - by Peter Dibble. Quoting the forward of the book "The basis of this book is the latter part of 'The Complete Rainbow Guide to OS-9'". (ISBN: 0-918035-03-1) (Microware product code: INS 68 SE 68 MO)

[end of mm1.background - last update 02/28/96 - erik seielstad spooky@iinc.com]