



MICROCODE SOLUTIONS

Fusion PC



Information about FUSION

What is FUSION?

FUSION is a software-only, full featured, 68K based Macintosh emulation. The emulation is a hardware level emulation, meaning that each piece of hardware found in a real Macintosh is virtually present in the emulation. If an application pokes at a piece of hardware to see if it exists, the application will think it is there. Support for video display hardware, floppy drives, SCSI drives, modems, printers, etc. are available using standard PC compatible devices.

FUSION is result of numerous years of Macintosh emulation technology. FUSION for PC compatibles is a direct port of our already successful Amiga version.

How does it work?

FUSION emulates the MC68040 microcode. This includes the CPU core and FPU core. At this time, the MMU core is not implemented, but will be as a future upgrade (providing virtual memory support). Microcode Solutions writes all of their code in 100% assembly language for whatever processor type is being used, yielding the fastest emulation possible.

To obtain the highest level of compatibility, real Macintosh ROM images are used. Software is provided with FUSION to dump a ROM from a real Macintosh. In accordance with copyright laws, you must own the machine you dump the ROM image from. Also, you may never use the machine you dumped the ROM from and the emulation at the same time. You can use 512K, or 1MB ROM image files. These are available in many machines:

512K - MacIIci, MacIIsi, MacIIlc, MacIIfx, PowerBooks

1 meg - Quadras (all), Performas (all), Centris (all), PowerBooks.
Please note that a 1MB ROM image is required for OS8.x support.

The hardware for all of the above mentioned machines (and more) is emulated completely, giving you unsurpassed compatibility!

FUSION uses real Macintosh system software. This software can be purchased from any authorized Macintosh dealer or mail order place.

FUSION can use real Macintosh formatted hard drives and removable media drives. FUSION is a MS-DOS based application, but can also be used in a Windows DOS box.

This emulation turns your PC hardware into a Macintosh.

Requirements

Minimum Requirements:

66Mhz 80486 CPU
8 megs of memory
20 megs of hard drive space
Macintosh System 7.1.0 software
1.44MB floppy drive
512K Macintosh ROM

Recommended Minimum Configuration:

90Mhz Intel Pentium Processor CPU
16 megs of memory
50 megs of hard drive space
Fast video card
Macintosh System 7.5 software
4x CD-ROM drive
1.44MB floppy drive
1MB Macintosh ROM

Recommended Optimal Configuration:

133Mhz+ Intel Pentium Processor CPU
32megs of memory
250 megs of hard drive space
PCI video card w/3D acceleration
Macintosh System 8.0 software
12x CD-ROM drive
1.44MB floppy drive
1MB Macintosh ROM

Features

- Works on all PC compatible machines with a 486 or higher CPU.
- Supports all Macintosh operating systems (7.x through 8.x).
- On the fly resolution switching (System 7.5.0 or later required).
- Supports 16, 256, "thousands", & "millions" modes (based on video hardware ability).
- Stereo audio via SoundBlaster and compatible audio cards.
- Support for up to 10 virtual Macintosh devices, including hardfiles and virtual floppy drives.
- Built-in CD-ROM support (requires MSCDEX).
- Direct SCSI access through any PC compatible SCSI controller (requires ASPI manager).
- Modem and printer support through any PC serial or parallel port.
- Support for Macintosh serial devices, such as graphic tablets & digitizers.
- Support for accessing PC drives from the Macintosh desktop.
- Custom FPU routines for high performance floating point operations.
- 100% hand optimized x86 assembly language for best possible performance.
- Support for 512K, and 1MB Macintosh ROM images.
- Easy to use, self-configuring user interface.
- Written by the leaders in emulation technology, responsible for the world's first color Macintosh emulation and the world's first

Intel Pentium processor compatible PC emulation!

- Includes software for capturing ROM images from a real Macintosh machine.
- Includes software for reading/writing Macintosh disk images for use with the emulation.

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Fusion PC

Technical Support:

Keyboard

FUSION emulates the Macintosh extended keyboard. You should really have an "extended" PC keyboard for full support.

If you are using FUSION from DOS mode, the WINDOWS key on extended keyboards will always be the same as the Apple COMMAND key. Whatever key you have defined for the COMMAND key in the setup will also be used.

If you are using FUSION from Windows, the WINDOWS key is ignored completely, and only the key you have defined for the COMMAND key in the setup will be used.

Because PCs and Macs don't use the same keyboard layout, the following is a list of differences:

Mac Key	PC Key	Function
F13	Print Screen	Function Key
F14	Scroll Lock	Function Key
F15	Not Mapped	Power On/Off key
Keypad =	Not mapped	Equal key
Special	Right-Alt-Pause	Force Shutdown*
Special	Ctrl-Print Screen	Screen Snapshot
Special	Ctrl-Alt-Del	Reboots PC! Don't use it!

Modems and Serial Devices

FUSION supports standard RS-232 and RS-422 serial devices in asynchronous mode. Devices that use synchronous serial communications will not work with the emulation due to limitations in the PC serial controllers.

You can use Macintosh compatible modems, graphics tablets, mice, cameras, etc. You can also use PC compatible modems, graphics tablets, mice, cameras, etc. as long as you have the proper Macintosh driver software.

Baud rates of 300 thru 115,200 are supported.

CD-ROM

FUSION supports two methods for using CD-ROM drives:

SCSI

SCSI based CD, CD-R, and CD-R/W drives are supported using your existing SCSI controller and software. In the SETUP program you

select your drive in the SCSI menu, NOT in the CD-ROM menu. Once you have selected your drive, you will need Macintosh driver software for your EXACT model CD-ROM drive. If you can not find a driver, we recommend CD-ROM ToolKit from FWB Software (<http://www.fwb.com>). Using SCSI is the **most** compatible method of CD-ROM support, as numerous programs will actually use direct SCSI commands for copy protection checking.

CD-R and CD-R/W software, such as Toast works fine under FUSION, so you can create your own CDs.

Playing audio CDs, extracting audio data, and examining multi-format and non-standard formatted CDs is possible only with SCSI based drives.

In order to use a SCSI device, you need to have an ASPI driver installed for your PC's SCSI card.

IDE or ATAPI

IDE and ATAPI based CD, CD-R, and CD-R/W drives have limited support, which is configured in the SETUP program's CD-ROM menu. It is not possible to play audio CDs or extract audio data using the built-in CD-ROM support, you must use a SCSI based drive setup in the SCSI menu.

When enabling the built-in CD-ROM support, the first SCSI device (SCSI ID 0) will not be selectable from the SCSI menu. This is because the built-in CD-ROM support assigns a CD-ROM drive as Unit 0.

In order to use the built-in CD-ROM support, you must have Microsoft's MSCDEX installed.

Setup

FUSION requires a configuration file. This configuration file is created by the SETUP.EXE program. You can have multiple setups, but the name of the setup always used by FUSION is: FUSION.CFG You can exit the SETUP program by pressing ALT-X, or by clicking at the box in the upper left-hand corner of the display. A mouse driver is required for the SETUP program to work.

Video

FUSION uses VESA for communicating with your video card hardware. VESA v1.2 or later is required. It is absolutely necessary that your video card's VESA driver be a FULL implementation of VESA. We have seen several motherboards that have on-board video controllers that only have enough VESA support to pass most diagnostics.

If you are having problems switching between the Windows desktop and FUSION (with v2.0 or later of FUSION), you have VESA problems. We recommend UNIVBE (available from <http://www.downloads.com>) or Scitech's DisplayDoctor (<http://www.schitech.com>).

There are several display drivers included with FUSION. We recommend the REFRESH drivers be used, as refreshed drivers allow for multiple depths (colors). The DIRECT drivers will display 256 colors only. The DIRECT drivers are faster for low end systems (486).

Printing

FUSION supports any serial or parallel printer that does not require bi-directional communications. You will need a printer driver for your EXACT model printer. Since real Macintosh machines do not use parallel for printer interfacing, special drivers are required for parallel based printers. Chuck's Printer Driver is a public domain program designed to allow the use of non-serial printers with your Macintosh. This program works well for the printers that it does support.

We recommend a commercial package for the Macintosh called, "PowerPrint". It is manufactured by InfoWave (<http://www.infowave.com>). The version you need is the 'serial to parallel' version, and it comes with a special serial to parallel conversion cable and software. For FUSION, you only need the software. The cable will not be used. We have contacted InfoWave, asking for them to produce a version that does not include the cable for our customers. We are still waiting a reply.

Mouse

FUSION supports any type of mouse that you may have. FUSION uses the installed mouse driver to convert PC mouse movement into Macintosh mouse movement.

For best performance of the mouse (to make it less 'jumpy') turn off the acceleration in your mouse driver, and set the sensitivity to about 3/4 of the maximum limit.

SCSI Devices

FUSION supports virtually any type of SCSI device. If you are using FUSION in DOS mode, you MUST have an ASPI manager installed. This software comes with your SCSI controller card. If you are using FUSION in Windows, then you will not need an ASPI manager as Windows has one built into it.

It is important that you do not attempt use the same SCSI device from the PC side while the Mac is using it, as data loss can result.

Miscellaneous

You can make a snapshot of the Mac's display by pressing RIGHT-CTRL+PRINT SCREEN. This can be done at anytime the emulation is running, even during the boot procedure.

The files generated by the snapshot are in PCX format (a popular graphics format like GIF, TIFF, JPEG, etc.) You will need a graphics viewer or converter in order to view the snapshots.

Sound

FUSION supports Sound Blaster compatible and Windows Sound System compatible audio cards. If your card is a plug-n-play device, then you probably will not need any type of DOS device driver when using FUSION v2.0 or later from Windows. You may need a device driver for DOS, and you may need to set the environment variables. Generally, this is all done for you when you install the audio card's

software. If you can not hear any audio, try setting the DMA16 to 0 (it defaults to 1). Some Sound Blaster compatible cards do not handle Sound Blaster 16 support, and this disables the 16 bit DMA, making it only 8 bit DMA. This is necessary for some Toshiba laptops.

Floppy Disks

FUSION supports real 720K PC, 1.44MB PC, 1.67MB PC, 1.44MB Mac, and 1.67MB Mac formatted disks. Depending your floppy controller, you may not be able to read/write the extended (1.67MB) formats. FUSION supports auto detecting disk inserts and ejections. Since a real Macintosh uses a motorized, electronic eject mechanism, it is not possible to manually eject the disk. Because the Mac OS was written with this in mind, it is possible to lose data if you manually eject a disk without being 'notified' to do so. When you drag the disk icon into the trash can (telling the Mac to eject the disk), FUSION notifies you of this by placing a floppy disk icon in the right side of the menu bar. You will see a disk with a number (0 or 1, indicating drive 0 or 1) with the 'X' symbol, meaning to eject the disk in the drive indicated. Likewise, if you remove a disk by accident (before the Mac no longer needs it in place), you will be notified of this by having a floppy disk icon in right side of the menu with the drive number and an arrow (meaning to put the disk back in the drive).

The auto detection logic necessary for all PC drives requires that the disk drive head be stepped back and forth. Unfortunately, this is the only way to automatically know when a disk has been inserted (this is not necessary to know it was removed). If the noise from the head stepping bothers you, simply turn it off and whenever you need to access a floppy, insert the disk into the drive and then press both SHIFT keys simultaneously. This forces the floppy drives to be scanned for a presence of a disk.

Some floppy drives are connected via a PCMCIA interface (laptop computers use these for peripherals). Sometimes floppy drives are not setup as A: and B:, and thus we have added the support for selecting virtually any drive letter. Please note that selecting a hard drive letter (such as C:) as a floppy drive, could result in corruption of that drive's data, so please make sure you have selected the proper drive letter.

Network Drives

FUSION supports the ability to mount a PC partition on the Macintosh's desktop. In order for this to work, you must have the Macintosh control panel, "PC Exchange". It is recommended that you use the latest version that is shipping with the OS8.1 system software. In order to access FAT32 partitions, and partitions larger than 1.0 gigabyte in size, you **MUST** have the latest version.

If you select a PC drive, start the emulation, and at the Macintosh desktop, you are prompted to format the partition, **DON'T DO IT!** There are only two reasons for this to occur:

1. PC Exchange is not installed and activated.
2. The drive does not match the criteria required for PC Exchange to work.

If PC Exchange will not work with the drive because of it's structure, there is nothing that can be done about it.

When running FUSION v2.0 and later under Windows, you can use Transfuse, which is a file transfer utility that allows access to ALL PC partitions, even non-standard devices through a network.

System Software Installation

FUSION uses real Macintosh system software. You can use any system from version 7.0.1 thru 8.1.x. Systems higher than 8.1 require a PowerPC processor, which FUSION does not currently emulate. Because FUSION emulates a variety of Macintosh models, it is essential that you install all of the resources from various machines. The only way to accomplish this is by doing a CUSTOM (sometimes called UNIVERSAL) installation for ALL Macintosh models. If you fail to install the system software using this method, you will experience problems while running certain applications.

You can **NEVER** use a pre-made hard file for any other emulation. Using another emulation with a boot partition (or hard file) setup for FUSION will corrupt it, making it unusable by FUSION. You **CAN** interchange hard files with other emulations, as long as you are not booting for the hard file.

It is easiest to install System software from CD-ROM (like the OS8.x CD). You can also install from Apple's high density installer disks.

The very first time you setup a hard file, it MUST be formatted before the Mac can actually even see it. This means if you create a hard file, start the emulation, and boot from the installer disk, the installer program will complain that there are no suitable drives to install to! You MUST always boot from the DISK TOOLS disk (included with Apple's install disk set). Once the Mac is at the desktop, you will be prompted to format the drive (hard file). Once this is completed, you can then boot from the INSTALL 1 disk and the installer will find the drive and allow the installation process to continue.

FAQ:

Section 1 - General Information

Question 1.1. What is FUSION?

FUSION is a 68040 based Macintosh emulation.

Question 1.2. How can I get more information about FUSION?

This FAQ will answer many of your questions, however, since our Macintosh emulation technology is constantly being updated, the latest information should be obtained from our web site.

Question 1.3. On which platforms is FUSION available?

Currently, the Amiga and PC platforms.

Question 1.4. How much does FUSION cost?

FUSION has a suggested retail price of \$49.95 USD. FUSION is being sold through mail order houses, department stores, and dealers.

Question 1.5. Who makes FUSION?

Microcode Solutions
1799 Kiowa Ave #107-670
Lake Havasu City, AZ 86403-2867

Question 1.6. How do I order FUSION?

You can order FUSION from any PC retailer or mail order house. You can also order directly from Microcode Solutions. Please allow up to 14 days for personal checks to clear. All orders must be paid for using U.S. funds, drawn on a U.S. bank or a U.S. Postal Money Order.

Question 1.7. How compatible is FUSION?

Nearly 100%! Currently, only programs that attempt to use the MMU will not work. These programs include: RAMDoublor, and Apple's built-in virtual memory manager. Future versions of FUSION may add this compatibility.

Question 1.8. How fast is FUSION?

Everyone likes to exaggerate or use various benchmark utilities to 'prove' they have the fastest emulation. Most people will judge the speed of a Macintosh emulation using MacBench from Ziff-Davis or Speedometer by Scott Berfield. We can produce any result you would like to see with either of these two benchmark programs. The bottom line is that an emulation can fool a benchmark program quite easily, so they can never really be used to judge the real-world performance of an emulation.

FUSION currently uses single instruction translation, which is the brute force method of CPU core emulation. The method currently being used is very fast on machines that have a large (512K or larger) level 2 cache. It is not as well suited for machines with no level 2 cache, but it is still quite usable. ALL of FUSION (from the interface to each device driver) is written in 100% assembly code that is hand optimized for the best possible performance. A 66Mhz 486 machine w/256K of level 2 cache can play most popular games (Maelstrom, Arashi, Pac-Man, etc.) at full speed, complete with stereo sound.

Although performance is a big issue, it is not our number one concern with FUSION. Compatibility is definitely the most important consideration we have when it comes to programming emulations. It does not matter if you have the fastest emulation available if it can't run anything.

Question 1.9. Does FUSION require ROMs and system software from Apple?

Yes! The only way to obtain near 100% compatibility is by using the original Apple software (ROMs and system software). Please remember that you **MUST** own the ROMs and system software. ROMs are easily obtained through repair centers & internet auctions. We provide software to run on your real Macintosh that will dump the ROM contents to a disk file, which is then used by FUSION (you don't actually need the ROMs in your PC).

Please do not pirate the ROMs. Do not go to your local library, Kinkos, or anywhere else that has a Macintosh just sitting around, and grab the ROM image. This is illegal!

Question 1.10. What type of Macintosh does FUSION emulate?

FUSION emulates all of the features of nearly all of the 68K based Macintoshes. For this reason, FUSION actually has better compatibility than any single Macintosh system. FUSION does allow you to change the Macintosh machine ID variable, so that programs looking for a particular model will think the model is present.

Question 1.11. How long has FUSION been in development?

The Macintosh emulation technology development started in April of 1992. Since this time, we have been responsible for the world's first color Macintosh emulation. We have also received product of the year twice, in two different magazines. We have numerous other awards and outstanding reviews of our Macintosh emulation technology.

Question 1.12. What limitations does FUSION have?

Currently, only one. Any application that attempts to use the MMU (built into the CPU), will not work. Fortunately, this is a very small number of programs (RAM Doubler, MagicMac, and only a few others).

The MMU is used to remap hardware and memory at different locations from where they physically exist. Apple's own Virtual Memory uses the MMU, and thus is not currently supported.

The new CPU core will contain MMU emulation, but this is really not a priority for us at this point since there are so few programs that actually need the MMU to function, and virtual memory is slow even on real Macintoshes.

Question 1.13. Can FUSION use 800 KB floppies?

Yes and no. FUSION can not use real low-density, 800K Macintosh formatted disks. However, software is provided with FUSION that allows you to create Pseudo-800K disks using normal PC floppy drives. If you have a 800K disk that you want to use with FUSION, you would need to use Apple Disk Copy and create a disk image. Our IMAGER program can then convert the image into a Pseudo-800K disk. Another option would be to use the image directly with the emulation, since FUSION supports up to 10 HardFiles and/or disk images.

Question 1.14. Does FUSION run all applications?

Only those programs that try to use the MMU will not work. Other than that, we have yet to find any 68K application that fails to run.

Question 1.15. Where can I obtain the demo version of FUSION?

From our web site:

<http://www.microcode-solutions.com/pc/fusion/software/frame.html>

Question 1.16. How does the demo version differ from the release version?

FUNCTION	DEMO VERSION	RELEASE VERSION
Device Support	Only 1 HardFile	Up to 10 HardFiles
Device Size	Limited to 100MB	Unlimited in size
Memory Support	Maximum of 8MB	Maximum of 768MB
Floppy support	1.44MB disks only	720K/1.44MB
CD-ROM support	HFS only	HFS/ISO9660/PhotoCD
Video Drivers	Refreshed only	Refreshed and Direct
Video Resolution	640x480 maximum	640x480 thru 1600x1200
Video Depth	256 colors maximum	16, 256, 32K, 16.7 million
Sound Support	DISABLED	SB/PRO, AWE32/64, WSS
SCSI Support	DISABLED	Full SCSI Support via ASPI
Network Support	DISABLED	Mount PC drives on Macintosh Desktop
Serial support	DISABLED	Full support for modems, printers, tablets, etc.

The demo was created to show proof of software compatibility and performance.

Question 1.17. Does FUSION have Ethernet networking support?

FUSION can support Ethernet networking if you have a

SCSI<>Ethernet adapter. We are looking into using PC Ethernet hardware with FUSION, so that this ability can be built-in.

Question 1.18. What is the best way to keep informed about FUSION?

Through our web site and mailing list.

Question 1.19. What's the FUSION mailing list?

The mailing list is for customers to have a direct contact with Microcode Solutions. The authors of our emulation software answer email several times daily, so don't be surprised if you get an answer to a question within minutes of asking it. The mailing list messages go to everyone who subscribes to the list. This means that when you ask a question, EVERYONE will see the question and EVERYONE will see the responses from other users and Microcode Solutions' technical support staff. Please be aware that due to the popularity of our software, expect more than 200 new emails each day.

To subscribe to the FUSION-PC mailing list, please go here:

<http://www.cullasaja.com/PC/FUSION/index.shtml>

Question 1.20. An application I tried crashes. What can I do?

Please note that THE MOST COMMON reason for applications to crash is improperly installed or corrupted system software. The first thing you should do after a serious repeatable crash is try re-installing the Macintosh system software. If that does not fix the crashing problem, try to reproduce the problem repeatedly. If you can, please note EXACTLY what steps are necessary to cause the crash, and send this information to our technical support staff either through the mailing list (preferred) or direct email.

Question 1.21. Is it legal to distribute the demo version of FUSION?

Yes, as long as you do not change the contents of the archive in ANY way. You must also notify Microcode Solutions via email, and receive a reply before distributing any software on CD-ROM. We reserve the right to refuse distribution of FUSION at any time,

without notice. Distribution of the release version of FUSION is violation of copyright laws, and is strictly prohibited.

Question 1.22. Can FUSION run Japanese and other system software?

Yes. FUSION can use ANY version of Apple's system software designed for 68K Macintoshes.

Question 1.23. How can I get a screen dump of FUSION?

You can either use the standard Macintosh snapshot function (COMMAND-SHIFT-3), or you can use FUSION's built-in grabber. The built in grabber can snapshot a screen at any time (even during pull-down menu operations and other situations where it is not possible to snapshot the screen on a real Macintosh).

Pressing ALT-PRINTSCREEN will snapshot the current display as a PCX file. Each time you start FUSION, it's numeric picture counter is reset. Each snapshot that you do will increment the counter so the filename saved is different. The filenames are fsnap0001.pcx fsnap0002.pcx, fsnap0003.pcx, etc.

SECTION 2 - Technical Questions

Question 2.1. What are the hardware requirements for FUSION?

Minium requirements:

- 486 CPU w/FPU
- 8 megs of RAM
- 10 megs of hard drive space
- VESA compatible VGA card

Question 2.2. What do I do if my VGA card isn't VESA compliant?

FUSION requires VESA 1.2 or later. You can obtain several different shareware VESA extensions, the most popular is UNIVBE. SciTech makes SciDoctor, which is the commercial version of their UNIVBE software.

Question 2.3. Does FUSION require an ASPI driver to access SCSI?

Yes, you MUST have an ASPI compliant device driver installed. FUSION supports direct SCSI access. This means that ANY type of SCSI device that you can connect to your Macintosh is supported by FUSION. These devices include: scanners, hard drives, CD-ROM drives, DAT drives, printers, SCSI<>Ethernet adapters, etc. ASPI drivers are available from the manufacturer of each SCSI controller card.

Question 2.4. Does FUSION work under Windows or any other OS?

Yes! Starting with v2.0, you can use FUSION in a DOS box. Normally, FUSION completely takes over the PC hardware, and turns your system into a virtual Macintosh. v1.21 and earlier were DOS only applications.

Question 2.5. How do I get FUSION to see my CD-ROM drive?

You can either use a SCSI CD-ROM drive and the emulated SCSI support, or use the built-in support with ANY type of CD-ROM drive and MSCDEX.

Question 2.6. How does printing work under FUSION?

FUSION can print to either serial or parallel printers. Just like a real Macintosh, you will need a driver for your particular model printer. If you can not find the proper printer driver, then we recommend using the commercial printer driver package called, "PowerPrint".

This package has drivers for thousands of printers.

Many printers will have Apple compatibility modes. Please check your printer manual concerning any such compatibility. AppleTalk printers are NOT supported since standard PC hardware can not interface with AppleTalk devices.

Question 2.7. How does telecommunications work under FUSION?

FUSION can use modems, graphics tablets, and any other serial device that is NOT AppleTalk based. Terminal programs, TCP/IP, FreePPP, etc. all work exactly as they do on a real Macintosh.

Question 2.8. Are real ADB devices supported under FUSION?

No. The Apple Desktop Bus is a proprietary bus interface. FUSION's ADB emulation is complete, making it possible to emulate devices such as dongles. ADB Joysticks and other input devices can not be plugged into PC hardware.

SECTION 3 - Common problems and solutions

Problem 3.1. Fusion will not start, what should I do?

If you cannot get Fusion to start, try deleting the FUSION.CFG file and running the SETUP program. Only select the video driver and set the memory to 8192K. Now, Launch the emulation. If you get a flashing '?' (question mark) inside of a disk image, then the ROM file and CPU emulation are working correctly. From this point, start adding things to the configuration (HardFile, CD-ROM support, sound support), one at a time until you figure out which setting is causing the problem.

Once you have determined WHAT is causing the problem, if you can not figure out the problem yourself, please email our technical support staff, explaining your EXACT problem. Email should be sent

to:

techsup@microcode-solutions.com

Problem 3.2. I don't understand how to dump a ROM image from my Mac!

The easiest way to obtain a ROM from a real Macintosh is as follows: Simply copy the file ROMUTIL.HQX from the /FUSION/UTILS directory onto a floppy disk. Take the floppy and put it into the real Macintosh that you wish to use. The Mac must have PC Exchange running in order to read the PC Formatted floppy. UnStuff the file on a real Macintosh using StuffIt Expander or any similar utility and run the ROM Extraction utility (ROMUtil).

The Fusion Setup program should recognize the type of ROM being used in the setup program. If Setup does not recognize the ROM, it is possible that the ROM is corrupted and cannot be used.

A list of machines and their ROM types can be found at

<http://www.macintoshos.com/> under the "Macintosh Museum." Each Mac is listed, along with specifications including ROM size.

Problem 3.3. The system software will not boot, what should I do?

Fusion requires "generic" system software; that is system software designed to run on any Macintosh. Certain releases and copies of the MacOS are platform specific and will not properly run with Fusion. If during your initial booting the "bomb" appears, the screen flashes randomly, and/or the system fails to start, you probably are attempting to use a version of the MacOS designed for one specific system. System software that is designed to work with all Macintosh machines will state so on the disk label or CD-ROM. If your disks or CD does not state this, it will NOT work with FUSION, no exceptions.

If you are attempting to use any version of MacOS 8, please remember that you must be using a 1 meg ROM. 512k ROMs are not supported under MacOS 8.

HardFiles from any other emulator (except the Amiga version of FUSION) **will not** properly work with FUSION. Using other HFV or

DSK files with system software installed will not work properly. While HardFiles from vMac or Executor may appear to work initially, you will have problems using them, resulting in a loss of data.

Do not contact Microcode Solutions for help regarding the use of non-FUSION HardFiles.

Problem 3.4. The system software installed, but I can't boot it!

A common cause of problems with the system software will be any faulty extensions or extensions not designed for use with 68K based Macs. After installing the system software onto the hardfile, you may want to disable certain problematic or unnecessary extensions.

To start the MacOS with extensions disabled, hold down the Shift key before booting. Later versions of the MacOS (Sys 7.5+) will show the message "Extensions Disabled" underneath the "Welcome to the Macintosh" message.

System 7.5 or higher users may use the Extensions Manager under Control Panels to enable or disable certain extensions. Other versions of MacOS require extensions to be manually removed from the Extensions folder, located in the System Folder.

Problem 3.5. FUSION does not seem to recognize my CD-ROM drive!

To boot the MacOS off CD, be sure to have installed all proper drivers before running Fusion. IDE drives require their driver is loaded (usually from config.sys) and that MSCDEX is properly installed. If your CD-ROM works in Windows but cannot be accessed after "Restarting in MS-DOS mode", you probably do not have the required drivers installed.

The CD drive must also be set up under the CD-ROM gadget in Fusion Setup. Setting the boot priority to CD will also cause fewer headaches.

Microcode Solutions Licenses FUSION-PC 68K Macintosh Emulation Technology!

On 5/23/2000, Microcode Solutions licensed its 68040 Macintosh emulation technology to Emulators, Inc. This in no way affects our customer support for FUSION-PC customers. All technical support questions concerning FUSION-PC should still be directed to Microcode Solutions. Microcode Solutions will release a stand alone iMac emulation called, "iFUSION". Customers that purchased FUSION, and were to receive a discounted price based on their purchase date/price will still be able to do so. Let's face it, we're in the year 2000 and we need Power PC support. Microcode Solutions' own programming pride has been standing in the way of development of our iMac emulation. We have spent too much time refining an already superior product, and it was time to let it go.

We are now focusing all of our resources on the completion of our Amiga PowerPC emulation, which will enable a quick release for the PC platform. The license of our 68K emulation technology is beneficial to everyone. Microcode Solutions is not leaving the Macintosh emulation scene, we are advancing it to the next level.... Microcode Solutions is the undisputed leader in emulation technology, developing the world's first full color Macintosh emulator in 1992 for the Commodore Amiga. Since that time, we have refined the product (FUSION) to be the most advanced Macintosh emulation available. In 1998, Microcode Solutions began porting the Amiga version of FUSION to the PC platform. The result is the world's first full color Macintosh emulation for the PC, capable of running more Macintosh software than any single model Macintosh made. Since the release of FUSION for the PC platform, Microcode Solutions has seen nearly 3 million downloads of the demo version! There were so many downloads the first day the demo was released, that it crashed our server! FUSION has been reviewed by dozens of Macintosh, PC, and Amiga magazines... all with raving reviews!

Today, Microcode Solutions is still on the cutting edge of Macintosh emulation technology, working toward completing an iMac (PowerPC) emulation module for existing FUSION owners. Microcode Solutions is also responsible for the world's first Intel Pentium based PC emulation! Microcode Solutions has also written Apple][+, and Atari 400/800/XL emulations. Microcode Solutions offers many products, for several platforms. Click on a link in the menu (located to the left) to select a category. Click the BACK function on your

browser to back up one level. Click HOME to return to this page.

I welcome you to check out our web site, download our demo versions, and see for yourself why Microcode Solutions will always be the leader in emulation technology.

Jim Drew, Microcode Solutions