IIe 3.0.1

Thank you for taking the trouble to try this program out. We hope you like it.

Note: this file is formatted and is best read with SimpleText and not TeachText.

Note: this file is not read-only so that you can easily copy the text if you want to. For example, you can copy the email addresses and URLs. Please don't modify this file or distribute modified versions.

Note: you should scroll up and down a pageful at a time so that the pictures will appear properly. If the pictures don't appear, you can make them appear by scrolling up a page and then back down a page.

Contents

The documentation for IIe comes in 4 files. Their contents are:

1. Read me first

It's best to begin with a word of warning:

IIe is a complex program and has some powerful features. You can easily lose Apple //e data by using this program "recklessly" so please do these two things:

(1) make a backup of all your important data and disk images, and
(2) read these documents thoroughly. By reading these documents, you'll understand how IIe works and how to use it safely and usefully.

You can disregard this warning to your own consequence. It will be pointless to complain to me that you lost your work. My reply will be: why didn't you read the instructions and make a backup? Of course I want IIe to work as reliably and as safely as a real //e would. Nevertheless, there are probably some minor bugs in this program, so it's best to be safe and always have a backup.

OK, that out the way, let's define some of the terms used below before getting started. The term "IIe" refers to this Mac program. In contrast, the term "//e" refers to the virtual Apple //e that you use in the "Apple //e" window, ie the virtual computer and not the Mac program and its menus, windows, dialogs, etc. Don't worry. It'll make more sense as you read along.

If you insist on reading the very minimum, you should at least peruse the Frequently Asked Questions which are at the bottom of this document.

What is it? - description, features, requirements, compatibilty, and performance issues

Description:

IIe is an Apple //e emulator for Macintoshes and PowerMacintoshes. It lets you run virtually any program for the Apple II, Apple II Plus, Apple //e, and Apple //c computers. It does not run Apple IIgs software.

It has been tested with a limited number of programs and works well with them. Most of the Apple II OSes boot up, including DOS 3.3, ProDOS 2.0.3, and Apple Pascal 1.2. Most games will work without problems. See below for more details about this version's abilities and limitations.

How does it work? IIe takes machine instructions written originally for the 65c02 microprocessor and emulates them in software. In other words, it uses the CPU in your Mac to do the work that was originally intended for a 65c02 microprocessor. The emulator keeps track of the 65c02 instructions, registers and memory usage, as well as converting the memory used for graphics or text into Macintosh graphics. As well, Apple II peripherals such as the Disk II (5 1/4" disk drive), and the UniDisk for 3 1/2" floppy disks are also emulated.

The goals of version 3 are more functionality and compatibility. New to version 3 are these features:

• sharp graphics - no more hard to read hires text!
• faster PowerPC emulation of 65c02 instructions (the emulator is now written in PowerPC assembly, using pipelining, branch prediction, and several optimisations that are only possible with assembly code)
• ability to ignore illegal opcodes
• ability to emulate a 6502 instead of a 65c02
• ability to paste text into an Apple II program
• support for more screen sizes from as small as 640 * 400 (PowerBook) to larger than 14" screens
• added an option for a joystick that doesn't auto-centre when you use the keypad
• drag and drop support for easier loading of disk images
• no longer requires you to quit IIe when you change slots (except that memory cards may not get the requested memory size until you allocate more memory to IIe by changing its size in the Finder)
• more peripherals such as printer card support - you can now print from your Apple II program to your Mac printer (text only)
• support for the original Disk II boot ROM (necessary for some disks to boot)
• more drives: the Mac-ProDOS card now supports two drives and the UniDisk card can support up to 4 drives in ProDOS when installed in slot 5
• can now eject real 3 1/2" disks from the Mac when you remove them from the //e's drive
• more compatible I/O space functioning for some programs that require random numbers (such as Castle Wolfenstein)
• can disable the 80 column card for Pascal programs which run better in 40 column mode (such as Wizardry)
• support for a user-selectable beep sound
• user-adjustable joystick limits (necessary for some games)
• you can now run the emulator at full speed - that is, as fast as your Mac's CPU will run it
• and last but definitely not least, numerous bug fixes

This version (3.0.1) fixes a few more bugs and has a few new features:

• supports keyboard input from the keypad when the joystick is the mouse and not the keypad

• you can now save the //e screen to a PICT file (the Dump command in the File menu)
• fixed problems with some programs like Wings of Fury
• no longer crashes when printing with some programs

Features:

• comes as a “fat binary” - that is, it contains both 680x0 and PowerPC code for optimal performance on any Mac. This version performs quite well on 68040 Macs and PowerMacs and performs “decently” on 68030 Macs. 68040 Macs should get 1Mhz //e performance. PowerMacs should be able to get 2MHz //e performance or better.

• able to display an Apple //e computer in a Mac window. This version supports all the //e graphics modes: text, lores graphics, double lores graphics, hires graphics, and double hires graphics. It even flashes text. The normal and alternate (“MouseText”) character sets are supported. The hires and double hires graphics can be displayed in monochrome or colour. Text and hires graphics displayed in monochrome mode can be displayed in a variety of monochrome colours such as white, green or amber (read that sentence twice if you didn’t get it the first time)

• able to take keystrokes on your Mac keyboard and pass them to the emulated //e. Supports the “open” (command) and “closed” (option) apple keys on the //e keyboard (as well as the third paddle button by the shift key - known as the “shift key modification”).

• the //e can be reset from your Mac keyboard (by pressing control-delete)

• able to read 5 1/4" disk and 3 1/2" disk images - this version supports all common image formats including 5 1/4" nibble images

• able to read directly from a 3 1/2" disk in the internal drive on your Mac and use it as a 3 1/2" disk in the emulator

• able to use a ProDOS partition of your hard disk as a ProDOS hard disk in the emulator. You can set up such a partition with “Apple HD Setup” or “FWB Hard Disk Toolkit”.

• able to directly read from or write to files in a Mac directory from any ProDOS program. This is a very handy feature and allows direct transfer of data without the need for PC Exchange

• supports fast reads and writes on Dos 3.3 and ProDOS 5 1/4" disks

• able to switch any disk in any drive at any time

• emulates a joystick by using the keypad on your Mac keyboard or the mouse

• emulates a RamWorks III RAM disk

• emulates peripherals such as a ThunderClock clock card, the AppleMouse mouse card, the Apple II Memory Expansion memory card, and a serial card with ImageWriter printer attached

• very configurable via an easy-to-use preferences and setup dialog

• supports Apple //e speaker sounds

• has a useful debugger to allow you to set breakpoints, inspect registers, etc. if you want to debug Apple II programs

Hardware and software requirements:

IIe requires:

• a colour-capable Macintosh (ie, not the Mac Plus, SE, Portable, or PowerBook 100). A fast 68030 Mac is the minimal hardware you should run IIe on. All PowerBooks except the PowerBook 100 can run IIe.

• a monitor of at least 640 * 400 pixel size (sorry to the 12" colour and Colour Classic owners)

• System 7 or later

• the Thread Manager (which is built into System 7.5 or later).

• Sound Manger 3.0 or later.

Recommended:

• a fast 68040 Mac or a PowerMac

• support for 256 colours

• System 7.5.1 or later

• Sound Manger 3.1 if you have a PowerPC Mac

• Thread Manger 2.1 if you have a PowerPC Mac

• Macintosh Drag and Drop if you are not running System 7.5 or later

• a ProDOS partition on your Mac hard disk (created with Apple's HD Setup program or a third party utility such as FWB's Hard Disk Toolkit) or a ProDOS hard disk image (using one of the files supplied in this package).

Compatibility:

This software has been tested on systems 7.1 to 7.5.3.

Currently there are no known Mac software conflicts. If you should find a problem, let me know.

With regard to Apple II software, there are some programs (especially games) that require special configuration to work properly with IIe. These are the known ones:

• Castle Wolfenstein image on www.asimov.net - requires the Disk II be in "compatible" mode not "fast" mode (or you can copy a normal DOS 3.3 onto it)
• Karateka - requires the original ("dumb") Disk II ROM to boot up
• Legacy of the Ancients - requires "ignore illegal instructions" to boot up
• Championship LodeRunner - requires the joystick x and y maxima be set to about 270 for play with the joystick
• Wizardry I (and probably the others as well) - requires the boot disk to be write protected (ie, locked) otherwise it will be destroyed by the program when you first boot it. If you don't like the 80 column text, click the 80 column card icon in the slots pane to switch it to 40 columns.

If you know of any other conflicts or problems, let me know and I'll investigate it and update the list as necessary.

Performance issues:

This version does not allow background programs much background time to run so you may find print jobs tend to slow down and modem downloads don't work well. Similarly, programs that take up background time will tend to slow down the emulator (because your Mac's CPU spends less time running the emulator). Even having a lot of other programs open will slow down the emulator - merely closing those other 6 apps will bring a noticable speedup in the program! :-)

For best performance:

• close all unecessary programs
• reduce the number of extensions you install at startup
• run IIe in Black & White mode (ie, 1-bit mode) - the fastest graphics blitters are the 1-bit blitters because they have the smallest amount of memory to blit
• use the small window size

• use direct drawing

Installation and setup

Simple installation/setup

To install and set up this program:

1) decompress the archive that this program comes in. You've probably already done this to be able to read this Read Me.

2) get a copy of the Apple //e ROMs*. If you're on the internet, you can get it from:

http://www.asimov.net/pub/apple_II/emulators/applepc/IIerom.zip

If you're on an online service, use its ftp ability to obtain the above file.

Use a utility such as "DropStuff with StuffIt Expander" or "ZipIt" to decompress the file.

*For legal reasons, the ROMs cannot be distributed with this emulator because they are the copyright of Apple Computer, Inc. "So what?" you might ask. Well, I personally don't enjoy getting letters from lawyers, and since I still own an Apple //e (and it still works just fine thanks), I have all the ROMs I need (well, almost all: if only I'd bought that mouse card, memory card, serial card, etc. etc. when I could have...).

If you don't have internet access but do have a real Enhanced //e*, you can follow these instructions to create your copy of the ROMs. You will need some way of transferring the file to your Mac such as a 3 1/2" floppy disk or some kind of serial connection. Ask your nearby user group for info about how to do this.

Note that in the following lines, the '0' character is a zero, and that anything between angled brackets '<' or '>' is one character - eg, <control-C> means hold down the control key and then press the C key (which is an invisible character).

Also, note that the ROMs in the Apple IIe card for Mac LCs are modified and will not work with IIe.

a) start up your //e and boot up ProDOS. Then run BASIC.SYSTEM to enter Applesoft Basic (it will display a ']' prompt)
b) type "call-151<return>" to enter the //e's monitor program (it will then display the '*' prompt)
c) type "2000<D000.FFFFM<return>"
d) type "C007:0<return>"
e) type "5100<C100.CFFEM<return>"
f) type "C006:0<return>"

g) type “<control-C><return>” to re-enter Basic
h) type “BSAVE APPLE2E.ROM,A$1000,L$5000”
i) transfer this file to your Mac as a binary file

* Enhanced //e’s have a 65c02 processor and when you run programs like AppleWorks, they will display folders and characters such as the open and closed apples on the text screen. Unenhanced //e’s have a 6502A processor and don’t have the special characters so AppleWorks ‘looks funny’.

3) make sure the ROM file is called “APPLE2E.ROM” and that it is in the same folder as IIe. If you want to see the icon for ROMs, change the type/creator of the file to ‘ROMs’/‘AIIe’.

4) set IIe’s memory size. IIe’s memory size is preset at 1700K (it will appear as about 2065K on PowerPC Macs with virtual memory off), which is optimal for 68K Macs using a 256K table which helps the emulator run faster. You can change this setting depending on what kind of Mac you have and whether you want to use the table:

• if you have a PowerPC Mac, you can set IIe’s memory size to 1200K if you have virtual memory on (or if you have RamDoubler on), or to 1565K if you have virtual memory off. If you set IIe to use more memory in the form of RAM disks, etc. then of course you’ll have to use larger values (depending on the size of your extra memory requirements).

• if you have a 680x0 Mac and set IIe to not use the 256K table, then you can reduce IIe’s memory size to 1500K. DO NOT set IIe to any value below 1500K or it may crash or behave erratically.

You are now set to use IIe. Read the information below and in the following documents to learn how to properly use it.

Tips

• changing the creator of a disk image to ‘AIIe’ allows you to double click the file to have IIe use it
• clicking the Mono/colour icon button changes the display from monochrome to colour and vice versa
• control-clicking the Mono/colour icon button changes the colour of the monochrome text/graphics
• option-clicking the Mono/colour icon button changes the screen’s bit depth from 8 -> 1 -> 4 -> 8, etc.
• control-esc or F15 will start/stop the emulator
• be sure to have backups of your Apple II disks because IIe can destroy the disks as easily as a real //e can! When you delete a file on your disk (or disk image), it’s gone!

You may be able to recover it with a disk utility program but it's much better (and a whole lot saner) to have a backup and restore it from that

Frequently Asked Questions (FAQ)

Q: The program complains about not being able to find a file called "APPLE2E.ROM". What gives?

A: IIe does not contains the Apple //e ROMs because they are copyrighted material. You will need to either dump your own ROMs or get a copy of the ROMs that have already been dumped. See the section "Installation and Setup" above for more info about obtaining them. Note that legally you cannot use the ROM file specified above unless you own an Apple //e.

Q: When I double click IIe, it starts up and then stops and I'm left back in the Finder. What's going on?

A: There was a problem during IIe's startup. The most likely causes are: Thread Manager not present or installed, out of memory, and corrupted preferences. Install Thread Manager if you are running a system prior to System 7.5. Try giving IIe more memory. Try deleting the preferences.

Q: The program starts up but then nothing happens. What's wrong?

A: When you start up IIe without any disks loaded into the drives, the //e is halted until a disk is inserted and the On/Off or Go/Stop icon is clicked.

Q: IIe starts up but then crashes/freezes/hangs/bombs/dies/stops working. Help!

A: Try these tips in the order shown:

1) restart with all extensions off by holding down the shift key until your Mac says "Welcome to Macintosh. Extensions Off.". If this works, then one of your extensions is conflicting with IIe. If you find out which one it is, let me know (send email) and I'll try to fix it.
2) give IIe more memory
3) turn off (uncheck) the "Direct drawing" option in the video pane of the preferences. Some Mac video cards don't like this option when it's on (checked).
4) install a new copy of IIe and delete the "IIe Preferences" file in your Preferences Folder (which is in your System Folder)

5) contact me with a detailed description of the problem and how to reproduce it. One request: you do not need to give me a 10 page list of your extensions; it usually is not helpful. If I need such a list, I'll ask you for it.

Q: It runs too slowly! Help!

A: try these suggestions in the order shown:

1) use the small window mode if you can
2) change to Black and White mode if your Mac's video system supports it
3) change the video frequency to 20Hz instead of 30Hz or 60Hz
4) turn on direct drawing
5) increase the CPU speed in the 65c02 pane of the preferences
6) quit all other programs
7) turn off all unecessary extensions, including File Sharing, AppleTalk, Virtual Memory, etc., etc.
8) get a faster machine (sorry but there's a limit to how fast any Mac can operate!)

Q: Talking of speed, why isn't IIe as fast as StopTheMadness on my 680x0 Mac?

A: IIe emulates an Apple //e and therefore requires a much more complicated memory scheme than StopTheMadness, which emulates an Apple II+. The price of being able to properly use 128K of Apple //e memory (or more) is that the emulator has to do more work to correctly access the memory. Result: slower performance than STM but more flexible and more powerful memory use.

Q: Talking of emulators, why isn't IIe an Apple IIgs emulator? Are there plans for this?

A: IIe was designed to emulate an Apple //e. Emulating an Apple IIgs is a lot more work and a much harder task. I have no plans for doing this and it is very unlikely I ever will. Instead, I recommend obtaining the FAQ of the internet newsgroup comp.emulators.apple2. There is mention in that document of the IIgs emulators currently in development (and yes, it's written for Macs).

Q: Some of the sounds that IIe makes don't sound right. What gives?

A: Emulating the Apple //e speaker is one of the hardest things to do right. IIe tries its best but may not always succeed. There isn't much that can be done about it. Most programs will sound OK and only a few will have problems. Choppy sounds may be due to too frequent video drawing or your Mac's CPU being too slow. Slower Macs may not produce continuous sound - sorry, but they just don't have enough CPU speed to do it. Try these suggestions:

1) try using 30Hz or 20Hz instead of 60Hz (see the video pane in the preferences)
2) use the smaller screen
3) use direct drawing (see the video pane in the preferences)
4) turn off as many extensions as you can
5) turn off any networking software you can
6) quit as many programs as you can (and not just close their windows)
7) get a faster Mac (well I had to mention this option, didn't I?)

Q: What do the numbers at the top of the window mean? What do the red circles and squares mean?

A: These are the drive lights and slot/drive indicators. When an Apple II program accesses the disk, the lights go on to tell you what is happening. You can click them to change the type of displayed lights (but clicking has no other effect on the program).

Q: The //e program I'm running suddenly stops, then a window labelled "6502 Debugger" comes up and it's full of gibberish! What on earth is going on?

A: Your //e program has come across a "break" instruction or an illegal instruction (or it has reached a breakpoint that was previously set). The most common reasons for this are: a buggy program or a //e conflict (eg, the program you're using doesn't like the Clock card in slot 2). This situation is analogous to your Mac displaying the dreaded "bomb" dialog: the CPU is stuck at a place it can't continue onwards from. It's fairly unlikely you'll be able to continue the //e program and save any data but you may want to try: click the "Skip" button to skip over the illegal instruction. If it works, save your file and reboot the //e to start it up in a "clean" state. To exclude a //e conflict, remove all unneeded "cards" from their "slots".

Of course, if you ended up in the debugger because of a breakpoint (it'll say so in the bottom left corner of the window) then just clear the breakpoints and click the "Run" button.

On a final note, you can check the "ignore illegal instructions" checkbox in the 65c02 pane of the Preferences to make IIe ignore illegal instructions.

Q: Why can't I get my program to work?

A: Some programs are "fussy" about your //e setup, and require certain hardware features. See the "Compatibility" section above for known incompatibilities and their work-around.

Q: What does the Interrupt icon do?

A: This halts the //e's CPU and puts you into the 6502 debugger. From here, you can set breakpoints and follow the code as it is emulated. To exit the debugger, click the Run button (but remember to clear the breakpoints).

Most people won't need to ever use this button. You will need to know the 65c02 instruction set to make sense of the 6502 Debugger window.

Q: Why is it that when I select a menu command with the mouse it works fine, but when I use the keyboard shortcut for that command then instead of doing anything, I get the key in the //e window?

A: when the //e emulator is running, all keystrokes are directed to the emulator window and menu commands are not interpreted. This is so that AppleWorks, Multiscribe and other programs which use "command-<key>" combinations will function correctly. To access the menu commands from the keyboard, first halt the emulator by clicking the "Go/Stop" icon or using the "Go/Stop //e" menu command in the File menu, then select your desired command, and then run the emulator by using the "Go/Stop" icon again.

Notes:

(i) if the "Go/Stop" icon or command is set up to function as an On/Off switch, then instead of halting the emulator, the icon will switch off the emulator and you will lose all of the contents of the //e's memory without any warning that this will occur. Be careful with this option!

(ii) if you have an extended keyboard, you can use the function keys to do many of the same functions that the menu commands do, and you don't need to halt the emulator to use them. Therefore, it is much easier to use the function keys if you can. See the file "2. Instructions" for details on what the function keys do.

Q: How much memory should I set IIe to use?

A: See the Installation and setup section above for a detailed answer. The "catch all" answer is 1700K, but it will need to be more if you set up IIe to use a RAM disk, etc.

Q: I changed the memory settings in the preferences but nothing happens. What's going on?

A: Changes to the memory settings won't occur until IIe is restarted. Here's how to change IIe's memory settings:

1) change the settings in the Memory pane in the IIe Preferences window and click the OK button
2) select Quit IIe from the File menu
3) increase or decrease IIe's memory requirements in the Finder's Get Info window
4) close the Get Info window
5) double click the IIe icon. IIe will then start up with the new memory settings.

Q: I have some Apple II disks. How do I get the programs to work with IIe?

A: If your disks are 3 1/2" disks, just run IIe and then insert the disk into the Mac's floppy drive. IIe will ask you which drive you want to insert it into. Select a drive and then the disk is accessible just like on a real //e. Note that this assumes that you have already installed the UniDisk/Hard Disk card into a slot (see the Slots Pane section in the "Configuring IIe" file for info on how to do this if you haven't).

If your disks are 5 1/4" disks, then you'll need a real //e to transfer them to floppy disk or to a Mac via a serial connection. Please obtain the "comp.emulators.apple2" FAQ available on the internet for a detailed description of how to do this. And if you're curious, the answer is "no, you can't use a IBM-compatible PC to read Apple II 5 1/4" disks".

Q: How do I write Apple II programs?

A: You should be able to find a book on this topic from a library or bookshop. If not, ask your local user group or programming association. On the internet, post a (polite) message to the newsgroup news:comp.sys.apple2.programmer

Q: Why doesn't the //e program I wrote work the way I want it to?

A: It's beyond the scope of these documents to tell you how to program or what is wrong with it. See the answer to the last question for some resources that you can try.

Q: Where on the internet can I get the latest version of IIe from?

A: Use a World Wide Web browser to get it from:

<http://www.usyd.edu.au/~vtan/index.html>

or

<http://www.kagi.com/authors/vincenttan/>

The latest version is always at the first URL. If you don't have internet access, then try these suggestions:

• ask someone who has access
• use a "cybercafe"
• try a public library (many have WWW access now)
• try a BBS
• ask your local user group

Q: Where on the internet can I find some Apple II software or information?

A: Try these places:

<ftp://grind.isca.uiowa.edu/> (hard to get in)

<telnet:grind.isca.uiowa.edu> (preferred method)

<ftp://ftp.hypermall.com/pub/apple2/> is a mirror of grind

<ftp://ftp.asimov.net/pub/apple_II/> (hard to get in)

<http://www.asimov.net/pub/apple_II> (much easier to get into)

<ftp://ftp.uni-kl.de/pub/apple2/> (can be hard to get in)

<ftp://friley131.res.iastate.edu/apple2/images/> (???)

<ftp://wilbur.stanford.edu/pub/apple2/> (???)

<ftp://apple2.caltech.edu/> (limited to 15 users, can also be accessed via gopher!)

<news:comp.emulators.apple2>

<news:comp.system.apple2>

I also recommend obtaining the document in this directory:

<http://www.asimov.net/pub/apple_II/FAQs/>

it contains useful information especially about transferring data from an Apple II to a Mac/PC.

Q: I downloaded a file but it doesn't load or run. What's going on?

A: If you download your files from the internet or you get them in compressed format (you can tell because the files end in ".gz" or ".zip") then follow these instructions to decompress them properly. I recommend using Internet Config 1.2, DropStuff with Expander Enhancer 4.0 or later, and StuffIt Expander 4.0 or later, since the combination of these programs can decompress the files correctly when you set up Internet Config for suffix mapping.

To do this, run Internet Config and click "File Mappings". Then add the file extensions ".dsk", ".do", and ".po". For each of them, click the "binary data" (and not "Macintosh") button. Then for ".dsk" and ".do" files, map them as File Type 'DSK5' and File Creator 'AIIe'. For ".po" files, map them as File Type 'DISK' and File Creator 'AIIe'. Save your changes. StuffIt Expander will now be able to correctly decompress the files.

Next, configure your transfer program (be it an ftp client or a WWW client) so that files ending in .gz, .zip, .dsk, .do, and .po are downloaded as binary data and not text.

Next, if the file ends in .gz or .zip, decompress the file by dragging and dropping it on StuffIt Expander. They will be decompressed and come out as ready-to-use IIe disk images which you can double click to insert them into IIe.

See the section "Disk inserting/removing" in the files "2. Instructions" for more detailed instructions on the file types that IIe supports.

Q: Why should I register IIe? After all, I have it now and can use it straight away.

A: IIe is released as shareware. You're free to try it out but if you decide to keep on using it, you're obliged to register. After all, it's a pretty good deal for you: you get the software and can use it without having to pay up front. Also, it isn't crippled or disabled - so what you see is what you get! On the other hand, unregistered versions remind you to register and have a time limit of one hour. :-)

I ask you to be honest about your use of IIe and pay the registration fee when you feel that you wish to keep the program.

Think about it from my point of view: this program was hard work. It wouldn't exist unless someone put in the time and effort to write it and make it work well and as bug-free as possible. It's only fair that if a payment is requested then you pay for it if you think it's worth it. Also, paying the fee is very encouraging for me and allows further development to be done.

On a final note, payment is a quick and simple thing to do. Please see the last document for details about how to do it.

I'll conclude with this: "thank you for supporting shareware".

IIe 3.0.1

Thank you for taking the trouble to try this program out. We hope you like it.

Note: this file is formatted and is best read with SimpleText and not TeachText.

Note: this file is not read-only so that you can easily copy the text if you want to. For example, you can copy the email addresses and URLs. Please don't modify this file or distribute modified versions.

Note: you should scroll up and down a pageful at a time so that the pictures will appear properly. If the pictures don't appear, you can make them appear by scrolling up a page and then back down a page.

Contents

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2. Instructions

It's assumed that you know how to use an Apple II computer. That is, you're aware of how to switch it on, insert a disk, boot a disk, remove a disk, use the keyboard and use the joystick. If you know these things then you'll find using IIe virtually the same as using an Apple //e except that the disk "insertion" and "removal" activities are virtual instead of real (unless you insert a real floppy disk into your Mac in which case it's real - hmmm, are you confused yet?).

If you don't know how to use an Apple II, just try using IIe anyway, but please don't send e-mail asking for this kind of help. Instead, trying posting a message to an Apple II message board. Be polite and explain your ignorance of the Apple II. There should be some kind soul to help you out. If you're on the internet, try the USENET newsgroups such as 'comp.sys.apple2.<something>' or 'comp.emulators.apple2'.

The following instructions pertain only to features specific to this emulator.

The Apple //e window

This window is divided into several areas:

The display area

At the top is the status display area. It shows you the disk drive lights and which slot/drive they belong to and what image files you have loaded into them. To insert or remove a disk, you can click on the disk image's name. With more cards installed in the //e, you will see more icons and names in this area (2 for the UniDisk/Hard Disk card (although 4 is possible), 1 for the memory card, 2 for the MacProDOS card). At the bottom right of the status area is the 'Soft caps lock' status line. You can activate the Soft caps lock feature from the IIe Preferences window (see the document "3. Configuring IIe" for instructions on how to do this).

The //e screen - screen snapshots

At the bottom left, of course, is the //e's display area which does the function of a real //e's video monitor. You cannot select anything in this area, but you can copy the contents of the //e screen to the Mac clipboard from the Edit menu. You can also save the screen as a picture with the "Dump IIe Screen…" command in the File menu.

The icon buttons

At the bottom right are eight useful icons to make it easier for you to use IIe. They are:

• "Insert… F5" lets you select disk images, memory images, and folders for use in a //e drive

• "Remove… F6" lets you remove a disk image from a //e drive. Note that if you insert a disk image into a drive that already has a disk image in it, the old image is closed first.

• "Reset" simulates a press of the //e's reset key (you can also achieve the same effect by pressing control-delete on your Mac keyboard). This icon is disabled is the //e is off or not running).

• "Go F15" or "Stop F15" starts and stops the //e (freezes and runs it). This icon can also function as an on/off switch such that clicking it would be the same as turning off a real //e. When configured in this manner, it will be displayed as "On F15" and "Off F15". See the "3. Configuring IIe" for instructions on how to configure it to do this.

• "Prefs… F7" opens the IIe Preferences window. If it has not been previously opened, it is opened at the top-most pane, otherwise it is opened at the most recent pane.

• “Slots…•-F7” opens the IIe Preferences window at the Slots pane to let you change the slots. However, changing the slots will not take effect until you quit IIe and start it up again.

• “Mono F13” and “Colour F13” changes the screen display from monochrome to colour and vice versa. You can also option-click the icon to change depths from 8 -> 1 bit depth, 1 -> 4 bit depth, and 4 -> 8 bit depth. You can also control-click it to change the display: if you’re in monochrome mode, it changes the monochrome-white colour from white -> green, green -> amber, amber -> white; if you’re in colour mode, it does nothing except in double hires mode in which case it will display a sharpened image (but this mode is slower than the normal unsharpened image).

• “Interrupt” halts the emulation at whatever instruction it is currently at and displays that in the debugger window. Don’t use this icon unless you really need to, or unless you know what you are doing. Why use it? Well it’s handy if you know 65c02 assembly and want to see what the processor is doing. Eg, “is it hanging or still reading the disk? I know! I’ll check by interrupting it!” Warning: the debugger window is still in development and as such is still very much “raw” in its functioning.

Function keys

If you have an extended keyboard, you can also use the F-keys at the top of the keyboard. There are 15 such keys, numbered 1 to 15. Their functions are:

• F3: this is the same as selecting “Copy” from the Edit menu. It will copy the //e screen to the clipboard (including text if in text mode).

• F5: this is the same as selecting “Insert Disk…” from the File menu or clicking the “Insert…” icon.

• F6: this is the same as selecting “Remove Disk…” from the File menu or clicking the “Remove…” icon.

• F7: this is the same as selecting “Preferences…” from the File menu or clicking the “Prefs…” icon.
• option-F7: this is the same as clicking the “Slots…” icon. It opens the preferences and takes you to the slots pane, where you can add or remove Apple II peripherals.

• F8: this is the same as selecting “Save IIe Image…” from the File menu.

• F9: step over instruction (active only when the debugger window is active).

• F10: step into instruction (active only when the debugger window is active).

• F11: step out of instruction (active only when the debugger window is active).

• F12: if the debugger window is not active (the emulator is running and is not being debugged) then this key will interrupt the emulator and control is handed to the debugger - it functions as if you had clicked the Interrupt button. If however the debugger window is active, then F8 will function as if you had clicked the Run button in the debugger window. The overall effect is to alternatively interrupt and execute the CPU.

• F13: this is the same as selecting “Mono/Colour…” from the File menu or clicking the “Mono/colour…” icon. You can also use the option and control keys to select extra options (see Graphics modes below)

• F15: this is the same as clicking the “power switch” icon. Depending on what option the power switch is set to, it will either halt/run the emulator or power-on/power-off the emulator.

Graphics modes

• IIe shows you the //e’s screen in a Mac window. This window should always be located on the same screen as your menu bar. If you have more than one monitor connected, please do not drag the window to a different monitor because IIe does not support multiple monitors.

• normal 40 column text, 40 column lores and “normal” hires graphics can be displayed in either a small 280 * 192 area or in a larger 560 * 384 area. You can alternate between the two sizes by clicking the window’s zoom box.

• 80 column text, 80 column lores and double hires graphics must be displayed in the large 560 * 384 window. You cannot switch to a smaller display whilst any of these modes are active, and activating any of these modes (such as “PR#3 [return]” from BASIC) will make the emulator switch to the larger size.

• clicking the mono/colour icon button changes the display of hires graphics and double hires graphics from monochrome to colour and vice versa. It does not affect text or lores graphics. Naturally, this button does nothing if your Mac’s monitor is set to display black-and-white (1 bit depth).

• clicking the mono/colour icon button whilst holding down the option key changes the depth of the Mac monitor. The depth is rotated from 256 colours (8-bit) to black-and-white (1-bit) to 16 colours (4-bit) and then back to 256 colours (8-bit).

• clicking the mono/colour icon button whilst holding down the control key changes the colour of the monochrome colour. Text is displayed in this colour and so will be affected, as will hires graphics and double hires graphics if the display is set to monochrome (by clicking the mono/colour icon button by itself). Note: control-clicking the icon does nothing if your Mac’s monitor is set to display black-and-white (1 bit depth).

Disk inserting/removing

You can insert different kinds of disks into IIe's "drives". They can be real 3 1/2" disks, real ProDOS SCSI hard disk partitions, or disk images - a (Mac) file that "contains" an Apple II "disk".

Using real disks

Inserting a real 3 1/2" disk

To use a real 3 1/2" disk, run IIe and when the "Apple //e" window is the front window, insert your 3 1/2" disk into any Mac drive. You will be asked if you wish to "insert" the disk into a "drive", and if so, to select which "drive" to insert it into. Select your drive and you're set to use that disk.

Note that although you can insert a Mac formatted disk into the disk drive and then have IIe "insert" it into one of its drives, it won't be very useful. For all practical purposes, you should insert a ProDOS formatted disk into IIe's drive (see below for info about ProDOS). If you wish to transfer ProDOS files that are on a Mac floppy disk for use in IIe, you should use the "MacProDOS disk" peripheral which allows you to transfer files on a Mac disk or folder directly into ProDOS running on the //e.

Inserting a real ProDOS SCSI hard disk partition

To use a real disk, run IIe. If you have configured a UniDisk into one of the //e's slots and you have a real ProDOS SCSI hard disk partition on your hard disk, you will usually be asked if you wish to "insert" that ProDOS SCSI hard disk partition into a "drive", and if so, to select which "drive" to insert it into. Select your drive and you're set to use that disk.

Using disk images

Introduction

To use a disk image, you need to prepare the file properly before you can "insert" it into a IIe "drive". A short description of why this is necessary and how to do this follows.

On the Apple II, there are 2 main file systems: DOS 3.3, an older format (and probably the more commoner of the two) which usually supports only 5 1/4" disks; and ProDOS, the newer system which supports different sized disks. The order and format of data on these two systems are completely different from each other, and therefore disk images of disks in these systems are completely different in order and format from each other.

As well, there is another file system called Apple Pascal, but isn't used much (Wizardry is probably the most famous program that used it).

5 1/4" disk images

Most of the disk images of 5 1/4" disks that are available on the internet are in "DOS 3.3" order and are stored as plain compressed (usually gzipped) binary files. They usually have a ".dsk" suffix and are usually 143360 bytes when decompressed. So a typical file is stored as 'coolgame.dsk.gz'. This is for the benefit of PC users. When you download such a file to your Mac and decompress it, the file is usually of the wrong Macintosh file type and creator (for example, StuffIt Expander decompresses such files to SimpleText text files: type 'TEXT', creator 'ttxt'). To use the disk image file with IIe, you need to change the type to one that IIe can use. The file's type should be changed to 'DSK5' and its creator to 'AIIe'. When you do this, the file can be double clicked and then opened by IIe.

Dos 3.3 ordered 5 1/4" disk images can also have a suffix of ".do". Again, change their type/creator to 'DSK5'/'AIIe'.

The other possible formats for 5 1/4" disks are:

• "ProDOS" order, usually with a ".po" or ".disk" suffix. Like Dos 3.3 order disks, they are 143360 bytes long. Change their type/creators to 'DISK'/'AIIe' for use in IIe, and
• "nibble" format. These images are usually 232960 bytes long. For example, another Apple II emulator for the Mac called "StopTheMadness" saves to disk images only in "nibble" format. To use them with IIe, change their type/creators to 'NIBB'/'AIIe'.

3 1/2" disk images

Most of the 3 1/2" disk images are similar to the 5 1/4" disk images except that they are usually in "ProDOS" order. Aside from that, they are usually stored as plain compressed (usually gzipped) binary files. Again, they usually have a ".dsk" suffix. Again, they'll have the wrong Macintosh file type and creator. To use the disk image file with IIe, you need to change the type to 'DSK3' and its creator to 'AIIe'. When you do this, the file can be double clicked and then opened by IIe.

For Mac users, a convenient format for 3 1/2" disks is the Apple Disk Copy format. This is the format that is created by disk imaging software such as Apple's Disk Copy 4.2 or Chad Magendanz's ShrinkWrap. Such disk images have "ProDOS" ordering. This format is different to the "plain" 3 1/2" disk image that is usually found on the internet. Disk Copy images have an extra 84 bytes of data at the beginning of the image to identify the image's format. Disk images in this format have the file type 'dImg'. This does not need to be changed for IIe to use them: you can drag and drop those files onto IIe's icon. However, if you want to be able to double click the disk image and have IIe open it, you'll need to change it's creator to 'AIIe'. The nice thing about this format is that you can mount these files on your Mac desktop if you have "ProDOS File System" or "PC

Exchange” installed: you drag and drop the image on top of “ShrinkWrap” or “DropDisk” and it will mount on your desktop. You can modify the image if you mount it with “ShrinkWrap” but not “DropDisk”.

Note that DiskCopy images that are modified by IIe can be written out to real 3 1/2" disks with DiskCopy since the checksums are updated when you remove the disk image from the drive or when you quit IIe.

Hard disk images

Finally, there are disks stored in hard disk volume format. They usually have a “.hdv” suffix. They are ProDOS ordered files and are usually images of Apple II hard disks. There are in fact two hard disk formats. The more common one is a ‘plain’ image, much like the plain floppy disk image mentioned above. Such images usually start with the hex bytes “01 B0 03” (use Norton Disk Editor to see this). These images should have file type ‘hdrv’ and creator ‘AIIe’ - the same as that used by ShrinkWrap 2.0 and ImageMaster 1.0. If instead the image starts with the text “SimSystem” then it should have file type ‘HDV ’ (note the space after the “V”) and creator ‘AIIe’.

Changing file types and creators

If you download your files from the internet or you get them in compressed format (you can tell because the files end in “.gz” or “.zip”) then it’s quite easy to decompress them properly. I recommend using Internet Config 1.2, DropStuff with Expander Enhancer 4.0 or later, and StuffIt Expander 4.0 or later, since the combination of these programs can decompress the files correctly when you set up Internet Config for suffix mapping.

To do this, run Internet Config and click “File Mappings”. Then add the file extensions “.dsk”, “.do”, and “.po”. For each of them, click the “binary data” (and not “Macintosh”) button. Then for “.dsk” and “.do” files, map them as File Type ‘DSK5’ and File Creator ‘AIIe’. For “.po” files, map them as File Type ‘DISK’ and File Creator ‘AIIe’. Save your changes. StuffIt Expander will now be able to correctly decompress the files.

Next, configure your transfer program (be it an ftp client or a WWW client) so that files ending in .gz, .zip, .dsk, .do, and .po are downloaded as binary data and not text.

Next, if the file ends in .gz or .zip, decompress the file by dragging and dropping it on StuffIt Expander. They will be decompressed and come out as ready-to-use IIe disk images which you can double click to insert them into IIe.

To manually change a file’s type or creator, use a file type editor such as ResEdit (free from Apple), BunchTyper (free), FileTyper (shareware), or Aladdin’s Desktop Tools (good quality commercial utility [biased opinion]).

How to insert and remove disks and disk images

After the disk image file is set up for use, there are several ways you can load it into IIe:

• you can drag it to IIe's icon in the Finder,
• you can double click the disk image (if its creator is set to 'AIIe'),
• you can select "Insert Disk Image…" from the File menu (or click the "Insert…" icon button),
• you can drag the disk image to the drive you want to insert it into. If the image can be loaded into that drive, the drive image's name will highlight when you drag the image over it; note that this only works in you are running System 7.5 or later, or have Macintosh Drag and Drop installed in pre-7.5 systems, and
• you can click the drive image name of the drive that you want to load the image into. An open file dialog will then ask you to select the image to load.

IIe supports two 5 1/4" drives and two to four 3 1/2" drives for each installed disk drive "card". You can have four 3 1/2" drives only if the UniDisk card is installed in slot 5, and the last two drives can only be available in ProDOS 2.0 or later.

You can remove disks by selecting "Remove Disk Image…" from the File menu or click the "Remove…" icon button. In the dialog that appears, select which disks you want to remove and click Remove. Note that you do not need to remove a disk before inserting a new one; newly inserted disks displace disks that are already in that drive (that is, the old one is automatically removed for you).

Loading and saving information - memory images

The best way to load and save your data is by saving it to a disk or disk image, which is done by selecting the save command in the Apple II program. However, there are some programs that don't let you save but there are times that you need to save what you're doing and return to it later - for example, you've spent the last 3 hours playing Lode Runner and you a wedding to go to. To solve this problem, IIe allows you to save its current state by the use of "memory images". In a nutshell, this operation takes a "snapshot" of the //e's memory and saves it on disk, where it can later be restored.

Note that the size of the saved image will be the size of the current //e memory including any extra auxilary memory you have allocated to the RamWorks III card. So if you have set up a //e with 1 Mb of auxilary memory, the saved image will be 64K (main memory) + 1024K (aux memory). IIe will not save the contents of any Memory Card you install in a slot however.

When you ask IIe to load a memory image, it first checks that the size of the saved image is the same as the current memory setup. If it is, it loads it in and restores the //e to the saved state. Of course, you lose whatever you had in the //e's memory. You will not be warned of this loss because IIe assumes you know what you're doing when you open the memory image. If the memory image's size does not match the current memo-

ry setup, then IIe will offer to load in only the first 128K or to cancel the load operation, and it will tell you what you need to set the memory size to if you want to load the whole image.

Emulator instructions

This section covers topics related to the use of the emulator and its peripherals.

Default settings

The default settings for IIe are:

- small screen
- no change in depth
- colour mode
- does not draw directly to your screen
- 1MHz speed
- 64K only of auxillary memory
- produces soft sounds
- no ‘delete’ key translation
- no type-ahead buffer
- soft caps lock disabled
- joystick emulation via the keypad
- fast disk reads and writes
- ask what to do if a ProDOS hard disk is found
- the default Mac-ProDOS folder is the folder that the IIe program is in
- Disk II in slot 6 (fixed)
- 80 column card in slot 3 (fixed)
- no other cards installed

Starting up the emulator

If you start IIe with a disk (by double clicking the disk image’s icon or by dragging it to IIe’s program icon), the emulator will start running as soon as it is ready and the disk is “inserted”.

However, when you start IIe without any disks in any drive, the emulator won’t run until you tell it to. You can start it up by clicking the “Run/Stop” icon button. Pressing it again will stop it. Alternatively, you can press F15. The icon will change to show you the state of the emulator. Of course, it isn’t very useful without a disk…

Bonus: if you start IIe up with the command and option keys held down, then IIe will use the title of the //e window to show you how many 65c02 clock cycles it has emulated in each of its emulation cycles (which are about half a second long).

The Reset key

To “reset” the //e, that is, simulate the pressing of the reset key on a real //e, press control-delete (the delete key here acting like the reset key) or the “Reset” icon button. Tip: to force a “cold” reboot, press command-control-delete or command-click the “Reset” icon button. If you want to see the //e diagnostic test, press option-control-delete (or option-click the “Reset” icon button) (but the test is kind of boring in my opinion…)

The Keyboard

When the emulator is running, all keystrokes are directed to the //e window. When the emulator is not running, all keystrokes are directed to the IIe program, that is, the menu bar or the frontmost window. So if you press command-I to insert a new disk and nothing happens, be sure that the emulator is not running. If it is running, press control-esc or F15 or the “Run/Stop” icon button, to first halt it and then press command-I (or just click the “Insert…” icon button if you don’t want to stop the emulator).

The ‘delete’ key on the Mac keyboard can be configured to produce either a ‘backspace’ or a ‘delete’ key on the //e.

IIe implements a type-ahead buffer so you won’t lose keystrokes but some programs (especially games) don’t respond with this on so you may have to turn it off. For text editors and word processors, you’ll probably want to turn it on.

The Tab key can be configured as a ‘soft caps lock’ key. If configured as such, then when you first press it, it changes any key you type from uppercase to lowercase and vice versa. When pressed again, it does not change the keys. In other words, it acts just like the real ‘caps lock’ key but the changes apply only to //e. This allows you to keep the real ‘caps lock’ key in your preferred position without having to change it every time you use another Mac program.

Paddles and buttons

The paddles/joystick is emulated by the use of either the Mac keypad or the mouse. If you have a joystick or gamepad attached to your Mac, you should set it to simulate the keypad.

If the keypad is selected to emulate the joystick, then:
• Keypad 7 is the same as pushing the joystick to the top-left

• Keypad 3 is the same as pushing it to the bottom-right
• Keypad 1 pushes it to the bottom-left
• Keypad 9 pushes it to the top-right
• The other keypad keys push it in between the corners

This arrangement works quite well - most programs have no problems with it.

If the mouse is selected to emulate the joystick, then moving the mouse around the screen will move the joystick in the same direction. You can configure the mouse paddle values to be based on the mouse's screen position or its position within the //e window.

This emulator uses a "smart" paddle emalation routine (technical weenies: it counts clock cycles), so all paddle/joystick reading programs should work. If you find a program that doesn't work well, let me know and I'll investigate it.

The "open" and "closed" apple keys on the //e keyboard (paddle 0's button and paddle 1's button respectively), as well as the third paddle button are supported. The Mac keys to use are command, option and shift respectively.

Debugger instructions

Important: most people will not need to read this section for ordinary use of IIe. This section covers the use of the debugger which is a tool for seeing what the //e is doing at the machine instruction level.

If you end up in the debugger and don't know what to do, try clicking the Run button. If it fails, try clicking the Reset button. If that fails, you'll have to power down the //e or quit IIe and restart it.

Currently the debugger is in a "raw" state, ie, incomplete and rough at the edges. However, you can use it to do some interesting things such as:

• set a breakpoint
• step an instruction
• step over an instruction
• step over all instructions in a loop and stop at the end of a loop
• step over all instructions in a 65c02 subroutine and stop at the point after the caller routine called the subroutine
• break on interrupts
• reset the //e
• run the //e
• disassemble memory
• change memory and the 65c02 registers

Oops. I'll get around to writing this section for the next release. Let's say that learning about the debugger "is left as an exercise for the reader" :-)

IIe 3.0.1

Thank you for taking the trouble to try this program out. We hope you like it.

Note: this file is formatted and is best read with SimpleText and not TeachText.

Note: this file is not read-only so that you can easily copy the text if you want to. For example, you can copy the email addresses and URLs. Please don't modify this file or distribute modified versions.

Note: you should scroll up and down a pageful at a time so that the pictures will appear properly. If the pictures don't appear, you can make them appear by scrolling up a page and then back down a page.

Contents

The documentation for IIe comes in 4 files. Their contents are:

3. Configuring IIe

One of the goals of IIe was to have a flexible and easy-to-configure //e emulator. To that end, it has many options which are presented in the following different categories. Each is shown as a separate “pane” within the IIe Preferences window.

To configure IIe, start it up and when the //e window is visible, click the “Prefs…” icon or select “Preferences…” from the File menu. You will then see the IIe Preferences window open up and General pane will be displayed.

In each displayed pane are some common buttons and controls. They are:

• the column of icons on the left of the window let you switch categories. Click on an icon to change categories or use the up and down arrow keys.

• the OK and Cancel buttons close the window and if OK is clicked, any changes you make are remembered. Clicking Cancel makes no changes to any preference you changed while the window was open. Pressing ‘return’ is the same as clicking OK. Pressing ‘esc’ is the same as clicking Cancel.

• clicking the balloon help icon turns balloon help on or off. The icon changes appearance to reflect the current state of balloon help.

• clicking the Use Defaults button changes all the preferences that are currently shown in the window to their default state. It does not change any other preferences in any of the other panes.

• clicking the Revert button restores the preferences to what they were when the pane was initially displayed. This is a subtle but important point. An example: if you open the preferences window, change a preference, switch to another pane, then go back to the first pane, change that first preference again, and then click Revert, it will revert that first preference to the setting it was after you first changed it.

General pane

This pane controls some general options for IIe.

On/off switch behaviour

When you change this option, the icon in the “Apple //e” window will change its label to reflect the icon’s functioning. The options are:

• Pauses and runs the //e: when this option is selected, the on/off icon (it looks like a power switch) will alternate between freezing and running the //e.

• Turn the //e on and off: when this option is selected, the on/off icon will behave like a real on/off switch. When the //e is on and running, clicking the on/off icon will switch it off immediately. Important: you will not be warned that you are switching off the //e and that any unsaved will be lost.

Warnings

• Warn about possible data loss when quitting IIe: when checked, IIe will ask you to confirm that you wish to quit from it. This is because when you quit IIe without saving any work or data you have made, you will lose that data. Having this option checked allows you to abort quitting IIe and so gives you a chance to save any unsaved data. If you just want to quit without a dialog slowing you down, uncheck this option.

• Warn if the preferred auxiliary memory size is not available (in which case IIe starts up as a 128K //e): if the memory size given to IIe is too small, it may not be possible to allocate the requested auxiliary memory. As a courtesy, you can have IIe let you know that it failed to allocate the memory by checking this option. It will then present a dialog

when IIe starts up informing you of the failure to allocate the memory. If the dialog annoys you, uncheck this option. To set how much auxiliary memory IIe should allocate on startup, go to the Memory pane (see below).

65c02 pane

This pane controls the 65c02 options for IIe (a 65c02 is the type of microprocessor that a real //e has).

Desired 65c02 speed:

Select the desired speed of the //e. Note that if you Mac's CPU is too slow, you may not actually get the desired speed. In which case, you'll either need to turn down the speed or get a faster Mac. I suggest the former if your wallet is thin. :-)

If you want IIe to go as fast as possible, use the Full option. Can't resist seeing how fast your PowerPC 604 is, eh?

CPU to emulate:

Some programs only work properly if a 6502 processor is emulated. Most programs will work fine with a 65c02. Some programs rely on a 65c02 processor.

Illegal opcodes:

Some programs use illegal instructions. Why? I don't know. Who knows why? Anyway, set this option on if the 6502 debugger window keeps bothering you.

For 680x0 processors:

The 68K version can use more memory for slightly faster performance that slower Macs may need. PowerPCs should be able to perform at least at 2-3MHz Apple //e performance and these options are not available for PowerPC Macs. The options are:

• Uses 256K table; faster; for 68030s: selecting this option creates a table that makes the emulator go faster but of course it uses more memory. Recommended for 68020 and 68030 Macs. Note that a 33MHz 68030 will get about 1MHz Apple //e performance and not much more than that so every speed up counts. Macs slower than this will not perform well.

• Does not use table; slower; for 68040s: selecting this option does not create a table. This option is recommended for 68040 Macs because they have enough speed to perform well without the need for the table, thus saving you 256K of memory which you can use for something else like a memory card.

Memory pane

This pane controls how much extra memory IIe will allocate when it starts up. Extra memory is usually used as a RAM disk. Using auxiliary memory as a RAM disk requires special “driver software” but does not use up a virtual “slot”. Using a memory card as a RAM disk does not require special software but does use up a virtual “slot” in the //e. Some programs know how to detect and use extra auxiliary memory and others know how to use a memory card. You should experiment with these options to find which is the most suitable for your use. As a general rule, you’re probably better off using a “memory card” instead of more auxiliary memory but remember that you lose a slot by doing so. Also, you should remember to “install” the memory card in a “slot” using the Slots pane (see below).

If IIe fails to allocate the extra memory you requested (it only does this at startup), you will be alerted to this fact. If you want the extra memory, you will need to increase the memory size for the IIe program by clicking IIe’s icon in the Finder and selecting “Get Info” from the File menu. In the window that opens, enter a higher number in the “preferred size” text field.

Auxiliary memory:

Originally, Apple released //e’s with 64K of memory only. Later on they started selling them with an “extended 80 column card” which included an extra 64K of memory called auxiliary memory. Building on this, some companies (such as Applied Engineering) released “super” extended 80 column cards that had more than 64K of memory. With these options, you can have IIe “install” a super “extended 80 column card” with the selected amount of memory. Note that you cannot install less than 64K of auxiliary memory. In other words, the smallest //e that IIe will run with is a 128K //e.

Memory expansion card:

IIe supports a memory card up to 1Mb in size. It functions just like an “Apple II Memory Expansion Card”. The card will auto-detect what operating system you are using (Dos 3.3, Apple Pascal or ProDOS) and configure itself to provide you with a RAM disk for that OS.

Video pane

This pane controls the video and display options for IIe.

Startup screen depth:

If speed is your concern, you can have IIe change your screen depth to a smaller depth for faster video drawing. Black & white is the fastest (but of course you can't see any colours). Millions of colours is the slowest. If you do change depths whilst IIe is running, then when IIe quits, the screen will be reset back to the depth it was in before IIe was started.

Startup window size:

The smaller screen is faster to draw but harder to read. 80 column text and double hires graphics must be displayed on the large window size and IIe will automatically change sizes if it is necessary.

Startup colour mode:

If you prefer a monochrome //e (I guess you must really love the "good ol' days"), you can set IIe to give you a monochrome screen when you start up.

Drawing method:

IIe can draw the //e's video in two ways. It can draw it into an area of memory and then copy that image to your Mac's screen (the indirect way) or it can draw it straight onto

your Mac's screen (the direct way). As you can imagine, direct drawing is faster because there is no need for the intermediate step of drawing it into an area of memory and then having to copy that memory image onto the screen. However, IIe comes with direct drawing OFF because a few Mac video cards don't like it when a program draws directly onto their video screens. Overall, most Mac video cards (or built-in video) will work fine. What you can do is try checking the "Direct drawing" checkbox and clicking OK. If IIe doesn't crash very shortly after you do this, then it's likely that direct drawing will work fine on your machine. If it does crash, it's likely that the video card doesn't like direct drawing so turn it off. If it crashes when you first start up after changing this option, you can disable it when you start up IIe by holding down the control key as you double click the IIe icon.

These are the conditions that must be satisfied for IIe to actually do direct drawing:

• the Apple //e window must be the front most window
• IIe must be the front most program
• no other windows must obscure the Apple //e window (including floating windows)
• the Apple //e window must be on the monitor that has the Mac menu bar on it
• the monitor that the Apple //e window is on must be at 1, 4 or 8 bit depths. Direct drawing does not work when the monitor is in thousands or millions mode. Instead, indirect drawing will be used when the monitor is in those modes.

Tip: move the cursor out of the window so that it won't flash as IIe tries to draw it. This applies to direct and indirect drawing.

Update frequency:

Some programs draw a lot and draw it quickly, in which case you'll want IIe to draw frequently. Be warned that if IIe spends more time updating the screen, then it will spend less time emulating a 65c02 resulting in less than desired performance. As the saying goes: "your mileage may vary".

Sound pane

This pane controls the sound options for IIe.

Sound volume:

There's not much to say about this. It's pretty self-explanatory.

The beep sound…

You can configure what sound IIe plays when a beep is made by a IIe program. Note that some programs use their own beep program instead of that in the Apple //e ROM and as such the sound you select may not be played.

Keyboard pane

This pane controls the keyboard options for IIe.

Pressing the ‘delete’ key produces a…

• backspace (ASCII 8): if you’re like me, you use the ‘delete’ key on your Mac keyboard for moving the cursor back one character and removing the last typed character. Unfortunately, the standard //e text line input program does not remove the last character when you type the ‘delete’ key and instead it inserts a ‘delete’ character into the line you’re typing (it looks like a checkboard character). Most of the time, this is not what you want. To fix this, select this option to have IIe send the emulated //e a ‘backspace’ character instead of a ‘delete’ character whenever you type the Mac’s ‘delete’ key. This will make the cursor back up one character as you would expect it to do.

• delete (ASCII 127): there are some programs which can recognise the ‘delete’ character and use it for deleting things. For example, AppleWorks uses it for deleting text in its word processor module. In which case, select this option to make the Mac’s ‘delete’ key to produce a ‘delete’ character and not a backspace.

Use typeahead buffer (no lost keystrokes)

Most Apple II programs read characters from the //e keyboard in the standard Apple II way, in which case, you should check this option so that any key you type is saved until the Apple II program requests it.

Some Apple II programs (especially some games) don’t read keyboard keys the standard way, resulting in the saved keys that you type never being sent to the Apple II program. To fix this, uncheck this option. However, if you type too many keys too quickly, you will find that some of the keys are lost.

Soft caps lock:

Many early Apple II programs only understand uppercase characters. You could use the ‘caps lock’ key on your Mac’s keyboard but you would have to set it up or down every time you switch from IIe to another Mac program and vice versa. To save you having to do this, IIe supports a ‘soft caps lock’ in the form of the ‘tab’ key. When this option is enabled (by selecting either the up or down options), IIe will treat the ‘tab’ key as if it were a ‘caps lock’ key. Pressing it once reverses the state of the soft caps lock and pressing it again reverses it back to its original state.

Note: this option sets the soft caps lock key's state only for when IIe is started up. If you change its state while using IIe, the new state is not saved.

Tip: if you need to use the 'tab' key to produce a 'tab' character (ASCII 9), then you must set this option to 'off'.

Joystick/Mouse pane

This pane controls the joystick and mouse options for IIe.

Source for joystick readings:

• Use Keypad: the keypad is used for the joystick. If Absolute is selected, then pressing, say, the 1 keypad key is the same as pushing the joystick fully down and fully left. If Relative is selected, the pressing, say, the 9 keypad is the same as slowly moving the joystick towards its top right corner from where ever it currently is (it starts up in the middle position).

• Use Mouse: the mouse's position is used for the joystick's position. If Window is selected, then the value returned is the mouse's position within the Apple //e window. If Scre-

en is selected, then the value returned is the mouse's position on your Mac's main screen.

Absolute joystick range:

You can specify what joystick values IIe can return to an Apple II program. Some programs require smaller ranges and others require larger ones.

Mouse options:

• Hide the Mac cursor when the Apple II mouse cursor is visible: when running mouse programs, it may be annoying to see the Mac's cursor following the Apple II mouse's cursor around the screen. If this bothers you, check this option.

Warning: if the Mac cursor is hidden, you'll find it very hard to click on icons or the menu bar because the mouse is hidden and you'll need to guess where the mouse is on your Mac screen. To make the mouse visible and use it on the menu bar or in a window, just halt the emulator with the On/Off icon*, then use the Mac mouse as required/desired, and then let the emulator run by clicking the On/Off icon again.

* assuming that it is set to Go/Stop mode and not On/Off mode, of course. See the General pane for more information about the On/Off icon.

Printing pane

This pane controls the printing options.

Printer card options:

These options determine what the font, font size and paper size is for any printouts. It is recommended that you only use fixed-width fonts for the selected font. Such fonts have characters which are all the same width. The standard fixed-width fonts are Courier and Monaco.

The printer card prints to:

The printer card can be configured to print to either an attached printer or to a PICT file. You can print to a disk file to preview your printout before printing to a real printer.

Printing/capturing is finished when…

There is no known way for IIe to reliably know when an Apple II program has finished printing. You have the option of letting IIe automatically stop printing after a certain a-mount of time or by manually pressing a key to signal to IIe that printing is finished. The automatic option can be disabled by unchecking the checkbox.

5 1/4" Disks pane

This pane controls the 5 1/4" disk options.

5 1/4" floppy disk image reading & writing:

• Fast - Dos 3.3 & ProDOS reads/writes are intercepted: Apple IIs do their disk reading and writing by software. This is could be emulated but is several times slower than if the reading or writing were done directly. If you select this option, IIe intercepts requests for reads and writes and performs them much faster than if the whole operation were emulated. Most Apple II programs will function OK with this option. If you find a program that does not read or write as expected (you usually get strange I/O error messages) then deselect this option.

• Compatible - Dos 3.3 & ProDOS reads/writes are fully emulated: select this option if an Apple II program is not reading or writing properly. When this option is selected, all reads and writes are fully emulated (and hence slower - sometimes much slower - than if they were intercepted).

5 1/4" floppy disk Disk II card ROM:

• Smart //c style ROM: this is a handy ROM because if you don't have a disk in the drive when the //e starts up, then the //e will continue to search the lower-numbered slots for a disk. Most disks can boot up using this ROM.

• Dumb II+ style ROM: some programs require the original Disk II ROM to be able to boot up at all. Such disks typically can't boot up on a real Apple //c. The disadvantage of this ROM is that if there is no disk in drive 1, then the //e will continue to wait forever until you insert a disk or press reset.

Other Disks pane

This pane controls the remaining disk options. It allows you to configure how IIe loads disk images and ProDOS partitions, how it ejects real 3 1/2" disks, and where the Mac-ProDOS folders are.

When opening a disk image with the “Insert Disk…” dialog, the default is to load it in to…

This is just a convenience option for when you have to swap disks a lot and the program that requests the swap thinks that you only have one drive, in which case selecting the “drive 1” option is very convenient. :-)

On startup, if a ProDOS hard disk partition is found…

Some hard disk formatting utilities such as Apple HD Setup program and FWB’s Hard Disk Toolkit allow you to format part of your hard disk as a ProDOS partition. This is very handy for IIe because you can load all of your //e programs onto the partition and have IIe boot this up everytime you start up. Typically, you would “install” the UniDisk/Hard Disk “card” into slot 7 (or 5) and select the “Insert into drive 1” option shown here. See below in the Slots pane section for information about installing the card.

After “removing” a real 3.5" disk from a UniDisk drive…

When you remove a real 3.5" disk from a drive, you can either have IIe try to mount it on your Mac desktop (assuming you have either the ProDOS File System extension or Mac PC Exchange installed) or have IIe eject the disk from the drive.

The Mac-ProDOS folders for…

Wouldn’t it be great if you could read and write to your Apple II files directly onto your Macintosh-formatted hard disk? Well you can. What you do is “install” the Mac-ProDOS “card” (see below in the Slots pane section to learn how to do this) and then select a

folder on your Mac's disk that will be the top-most directory of a pseudo ProDOS disk which will appear in whichever slot you install the "card" into. Note that because it's not a real ProDOS disk (it's a Mac folder that pretends to be a disk), not all ProDOS operations can be done. Programs that read or write files will work but programs that inspect or alter the disk's structure will not. For example, you can save word processor files in AppleWorks onto the "disk" but you cannot use Bag of Tricks 2.0 to check its volume bitmap, because it doesn't have one.

To set the folder to your desired folder, click the button and navigate to it. The selected folder will be set up when IIe starts up. You can change the current folder at any time by dragging and dropping a folder onto the IIe icon or by selecting it from the Insert… icon, but the newly selected folder will not be remembered after you quit IIe; only the folder specified in this preference will be remembered.

Slots pane

This pane allows you to set up which "card" goes into which "slot" of the //e. Doing this is easy enough: just drag the "card" you want to the "slot" you want it in. To remove a "card", drag it back to its icon at the top.

The only special icons are the 80 column card icon and the slot 6 disk icon. You can only click the 80 column card icon to switch to a “40 column” card. Click it again to switch it back to an 80 column card. This is useful only to Apple Pascal programs which run better in 40 column text mode (such as Wizardry). You cannot remove the 5 1/4" floppy disk card in slot 6.

IIe 3.0.1

Thank you for taking the trouble to try this program out. We hope you like it.

Note: this file is formatted and is best read with SimpleText and not TeachText.

Note: this file is not read-only so that you can easily copy the text if you want to. For example, you can copy the email addresses and URLs. Please don't modify this file or distribute modified versions.

Note: you should scroll up and down a pageful at a time so that the pictures will appear properly. If the pictures don't appear, you can make them appear by scrolling up a page and then back down a page.

Contents

The documentation for IIe comes in 4 files. Their contents are:

Cost/fee and registration

IIe 3.0.1 is released as shareware. That is, you can freely copy and distribute this version as you see fit, but you may not modify it nor may you charge more than a reasonable fee for distributing it. If you decide to keep it, you are then obliged to send in the registration form and the fee of US$30. On doing so, you will be sent a registration letter (preferably by email since it is faster and cheaper than normal mail) which will tell you how to register your copy of IIe. You may not distribute the registration letter or registered versions.

If you have registered a previous version (2.0 to 2.0.3) then you upgrade to v3.x for the small fee of US$5.

OK, so how do I register/upgrade?

1) Start up IIe. When the main window is visible, go to the Register menu and select “Fill in registration form…”.
2) Follow the dialog prompts and enter the required information.
3) If you wish to upgrade from a previously registered version, be sure to change the “I wish to register” menu to “I wish to upgrade”.
4) Save or print the form and send it and the fee (or the necessary information) to the shown email address or normal mail address. If you send email, you should receive a reply within a few days to a week (depending on the backlog). If you send normal mail, it may take a few weeks to process the form. Please be patient. If at all possible, please include an email address. You will get a much faster reply by doing so.

Version history

1.0 — Released Dec 21, 1995. First release. Project commenced Oct 23, 1995. All code except support for the internal floppy disk written by Vince. Support for the internal floppy disk written by my brother Victor - you know, the guy that wrote SpeedyFinder7 and co-authored CyberFinder!

2.0 — Released Mar 2, 1996. Major rewriting to add speed and features. Vince wrote: the PowerPC CPU, memory, floppy disk, UniDisk, user interface (dialogs and icons), preferences, about box, registration code, and these documents. Vic wrote: the 68K CPU, the graphics blitters, the sound code, the Memory card, the Mouse card, the Clock card, the Mac-ProDOS card, support for real floppy disks and SCSI hard disk partitions, and the 6502 debugger window. Whew.

2.0.1 — Released Mar 3, 1996. Fixed a bug causing crashes on 68K Macs when opening the preferences.

2.0.2 - 2.0.3 — Released May 1996. Fixed a problem with 5 1/4" nibble disk images and booting 3 1/2" disks.

3.0 — Released June 30, 1996. Major update to add features and fix bugs. Vince wrote: the printer card, user interface (now supports drag and drop), preferences, support for more drives (Mac-ProDOS and UniDisk), and these documents. Vic wrote: the PowerPC CPU (now in full assembly) and the sharp graphics blitters (again, in assembly). Many bugs with the disk images, the clock card, the mouse card, and the memory card were fixed.

3.0.1 — Released August 6, 1996. Mostly a bug fix release with a few new features. Now supports keyboard input from the keypad when the joystick is the mouse and not the keypad; can now save the //e screen to a PICT file (the Dump command in the File menu); fixed problems with some programs like Wings of Fury; no longer crashes when printing with some programs.

Future version features

This is the list of possible features to be added in a future version:

- ? better video modes (small colour double hires)
- ? mockingboard support (coming soon I hope now that I've got one of the beasts)
- ? further serial card support (printing fonts, printing graphics)
- ? ability to save the memory card's contents as a separate file/hard disk image
- ? display useful info such as track/sector being read or written

If you have an idea for a feature you'd like to see, why not write and let me know about it? I know there are plenty of Apple II enthusiasts still around so why not help me make this a better program? I'm sure we'll both enjoy the results. :-)

Distribution

Disks and CD-ROMs

The unregistered version of IIe 3.0 and only the unregistered version may be distributed freely but it must be distributed in its entirety, that is, with this Read Me, and neither the program nor this Read Me may be modified in any way, shape or form. It can be put on disks and CD-ROMs. I (Vincent) would appreciate a copy each of any such disks or CD-ROMs so that I know what it is being distributed on. Thank you.

I also ask that you contact me about the latest version so that only that version is distributed.

WWW and other internet methods of distribution

The latest version is available at this internet World Wide Web location:

<http://www.usyd.edu.au/~vtan/index.html>

or

<http://www.kagi.com/authors/vincenttan/>

If you wish to add a link on your WWW page to this page you are most welcome to do so. On the other hand, if you want put the actual binhex on your WWW or ftp or gopher (or whatever) site for others to download then you can do so provided that only an unmodified copy of the binhex on the above site is used. You may not offer a decoded version nor may you decode it, change something (or nothing) and then recompress and rebinhex it - in other words: you may only offer the exact same file that is on this site.

Contacting the author

Please, if you have a problem with this program, read these documents first to see if the answer is already here! This will save both you and me a lot of time and trouble. Thank you for your help on this matter.

Otherwise, if you have comments, gripes, if you found something missing or something not clearly explained, or whatever... write to me and let me know your thoughts about this software. I'm always happy to answer your enquiry and improve this software.

To write via e-mail, send it to either of these (internet) addresses:

<mailto:vtan@extro.ucc.su.oz.au>
<mailto:VincentTan@kagi.com> - the mailer daemon here will re-route it the first address

Please put "Apple IIe" or "IIe" in the Subject line so we know what it's about. Thank you.

Other software by Vincent

• Jigsaw 2.1. It's a cool shareware program that lets you play jigsaw puzzles on your Mac and has many options and features to keep you engrossed for hours. It's certainly

better than the one you get with System 7.5 - “You call that a puzzle?” :-) It’s currently available in English, Dutch, French and German versions. (If you want to translate it, I can give you a registration for your efforts.) The latest version is 2.1•. A starter picture is included. Jigsaw can open PICTs, JPEGs, GIFs, and several other formats.

• Control Strip Menu 2.3.2. Make your Control Strip give you easy access to any file on your disk by popup menus of your favourite folders (similar to the many Apple Menu extensions currently available). Features: supports drag and drop; has “sticky menus” feature to make navigating folders easy; draws cool icons. Very handy to have. Shareware. Also available in German and Italian.

• AddGIFcomment 1.0.1. Allows you to add a comment to a GIF picture file. Freeware.

• AddJFIFcomment 1.0.2. Allows you to add a comment to a JPEG/JFIF picture file. Freeware.

• ResComparePatcher 1.0. Source code that allows you to create a ResCompare patcher that can patch fat [68k & PowerPC] applications. Freeware.

On the internet, you can obtain the latest versions of these titles by using an ftp client to get them from:

ftp://sumex-aim.stanford.edu/info-mac/game/jigsaw-20.hqx
ftp://sumex-aim.stanford.edu/info-mac/game/jigsaw-21-updater.hqx
ftp://sumex-aim.stanford.edu/info-mac/gui/control-strip-menu-231.hqx
ftp://sumex-aim.stanford.edu/info-mac/grf/util/addjfifcomment-102.hqx
ftp://sumex-aim.stanford.edu/info-mac/grf/util/res-compare-patcher-10.hqx

or better yet, use a mirror site such as <ftp://mirrors.aol.com/>

You can also get them by visiting this World Wide Web site:

<http://www.usyd.edu.au/~vtan/index.html>

or

<http://www.kagi.com/authors/vincenttan/>

The first WWW URL also has software by Vic on it, as well as useful links.

Disclaimer

I hate these. Anyway, it’s the usual stuff:

Use at your own risk. The author accepts no liability for any damage caused. All other copyrights are held by their respective owners. Etc, etc, etc.

'Told you I hate them.

Aren't you glad I don't bore you with a License Agreement? :-)

Have fun,

Vincent.

August 6, 1996.

PS: if you really want to know why I wrote this, it's because I got envious of the fact that other platforms had //e emulators and the Mac didn't. I thought it was sad that the company that made and sold Apple II's no longer had any way of running Apple II software except by the IIe card for Mac LC's perhaps - and who can find one of those beasts nowadays?

PPS: why did Vic help? Because he loved working on it. There's just no doubt about it: Apple IIs are a lot of fun! ;-)

PPPS: many thanks to all those who have written with problems and suggestions and thanks. It's all appreciated greatly.