The Apple *III*
Personal Computer System

The Most Powerful Professional Computer System in Its Class

THE APPLE /// FAQ FILE V. 5.2

SOME BASIC INFORMATION FOR EVERYONE INTERESTED IN THE APPLE ///

By David Ottalini (dave.ottalini@wap.org)
Apple /// SIG Chairman
Washington Apple Pi Users Group
www.wap.org
apple3info@verizon.net

Additions/Corrections welcome to the above e-mail address.

Version: 5.2
February 17, 2007

CONTENTS

1) WHAT IS THE APPLE ///?

A) Historical Background

The Apple /// (code name: SARA- after the daughter of developer Wendell Sander) was the first computer designed from the ground-up by Apple Computer as a company. It was a business machine designed to include many of the "extras" Apple II owners had to buy: an 80-column card, a serial card, larger memory, keyboard with keypad, etc. It was supposed to be, as Andy Hertzfeld describes it, the "big brother" of the Apple II. It was one of the most powerful 8 bit computer systems ever built.

Apple Buyer's Guide described the /// this way:

"A more powerful version of the Apple // series, the Apple /// is designed principally for business applications. Ideally suited for sophisticated small business and professional applications, it deftly handles accounting, financial modeling, data-base management, word processing, graphics, communications – all your business needs."

Later comments added:

"With more than 400 business programs available for the Apple ///, there's a good chance that the program you need is on the shelf at your local authorized Apple dealer. In addition, the Apple Softcard /// System opens up more than 3000 CP/M programs to the Apple ///. And thousand of Apple II Plus programs run on the Apple /// in emulation mode."

The heart of the /// was its operating system known as SOS for "Sophisticated Operating System." It was considered to have been one of the best operating systems for small computers of its day: It was so good, in fact, that Apple later based its ProDos Operating System for the Apple //e, //c and GS on SOS.

Apple said of SOS in the *Buyer's Guide*:

"One of the Apple ///s strongest features – and one of its least visible – is its Sophisticated Operating System (SOS). More than 400 application programs written for the Apple /// are based on SOS, the first operating system to bring a truly flexible range of services to the personal computer.

What SOS means for you is this: it simplifies using your Apple ///. It's not necessary, for example, to know which disk drive contains the information (or file) you need, which slot the interface card for an accessory occupies, or which bank of memory is in use. SOS handles these and other operations automatically."

Andy Hertzfeld was a software and hardware engineer at Apple, who worked on the original ///, the IIe and later the Macintosh. Although the Mac OS was radically different from SOS, Hertzfeld says the Apple /// OS did have an impact as he worked on the Macintosh's HFS (Hierarchical Filing System). In a 1987 interview with Dave Ottalini, Hertzfeld said:

"I did the Macintosh Operating System and I was very familiar with the Apple /// and especially in the I/O system of the Macintosh, I was influenced by the Apple /// operating system."

Dr. Wendell Sander, the father of the Apple ///, told Ottalini it was nothing less than "one of the most professional and best done" operating systems:

"The /// software was exceptional. It really set the standard. Even to some extent the MS-DOS was, if you look closely at it, many of the concepts that were developed in SOS were carried through in MS-DOS. So it really has to be rated as a very important event in software for micros because it was the first really solid operating system. I still think it is probably one of the most professional and best done. That is in the sense of being able to get modules in and out of it and adapt to it and add to it and expand on it, SOS is still probably better than any of the popular operating systems on micros. So, that's certainly true that it set a standard."

Steve Wozniak, one of Apple's three founders, also had high praise for SOS. He told *BYTE Magazine* in December 1984: "I think [SOS] is the finest operating system on any microcomputer ever."

B) Development

Apple's great success with the Apple II was fraught with a lack of confidence. There were fears the public would grow tired of the II and that competitors would bring out more powerful machines that were considered more suitable for a business environment. Thus the idea for a successor to the II took hold and Dr. Sander, who had been working on Apple II projects, was tapped to design the ///. His design team included Walt Broedner, John MacDougall and Dan Kottke (who did the prototypes).

Software design was handled by a number of people, including:

Bruce Daniels, initial software system
J R "Dick" Huston, SOS file system designer,
Tom Root, console device driver
Rick Auricchio, SOS, device drivers,
Stephen Smith, mouse device driver
Bob Etheredge, SOS
Bob Martin, SOS
Donn Denman, Apple /// Business BASIC
Al Hoffman, Apple /// Pascal

Work began in late 1978, but Sander soon ran into trouble thanks to hardware and software concerns, as well as Apple's inability to really decide what it wanted the /// to be. As *West of Eden's* author, Tom Rose writes, "Everyone had a wish list."
The /// was to "represent an attempt to correct or add most of the capabilities missing from the Apple II" (Apple's Bruce Daniels memo of June 14, 1979). It had to access more memory, provide better graphics, offer a real keyboard capable of upper and lower case, and a new OS. It also had to be backwards compatible with the II. That forced Sander and his team to design the /// using the Apple II CPU and make many other compatibility concessions that would not have been necessary otherwise.

Also on the hardware side, Sander had to contend with Steve Jobs' demand that there be no fan and an upcoming FCC edict that computers must be shielded to prevent radio interference. The final solution was an all-in one case that basically was a giant heat sink and RF shield. An automotive engine foundry got the contract to manufacture the ///'s heavy aluminum case.

This led to major problems. Since the case had no flexibility, the motherboard could only be a certain size with little room for growth. The memory card had to be piggybacked on top of the motherboard since there was no room anywhere else.

(For more on the ///'s design challenges see: www.landsnail.com/apple/local/design/apple3.html)

We've talked about the emulation issues. In that June 1979 memo, Daniels wrote about software development for the ///. He said that it would include an "Apple II emulation mode (that) provides an architecture that is as close to the current Apple II as feasible so that its software will run with "little or no" modification. Unfortunately, it may not have been clear at that point that the hardware design forced on Sander and his team would not only doom emulation mode to a shadow of what Daniels said was needed (or thought would be part of the design), but would also guarantee it would be difficult for the /// to survive in the marketplace.

As it turned out, not only would full emulation have been very expensive to provide on the software side, but it would also have required a number of additional chips on the motherboard that did not have the space for them (Titan later was able to fully emulate the IIe with two plug-in cards!). As a result, Sara was stuck running 48k Apple II+ programs, it was not 100% compatible and emulation mode was not easy to use. An internal memo by Apple Engineer Bob Etheredge in 1981 admitted that "emulation mode has cost the company several man years in development, testing and support, and has severely handicapped the Apple ///'s hardware design, e.g. choice of processor, i/o mapping, video capability, etc."

C) Introduction Problems

Few developers came on board at the beginning - they were too busy working on Apple II products, SOS 1.0 was developer unfriendly and Apple did little to ensure there would be new software packages to start despite that 1979 memo which specifically said "the software for this system will be critical to impact and success of this product."

Another major problem was that Dr. Sander and his team were under orders to get the /// out the door quickly thanks to continued concerns about the Apple II's sustainability. Dr. Sander told Washington Apple Pi's Dave Ottalini in a 1986 interview that that was a big mistake:

"It was probably introduced into the marketplace six to nine months too early largely because there was a great worry within Apple for a long time that the Apple II's demise was just around the corner. I think maybe they've learned the Apple II's demise is not just around the corner! There was this concern that "Wow, if we don't get this thing out next month, Apple II sales are liable to go down and we're really dead, we're in big trouble. So there was probably too much push to get it out."

The Apple /// was officially introduced at the National Computer Conference in May 1980. Because the machine was never properly tested, there were immediate problems when shipments of SARA started in the fall. The ///s would work for a short time – and fail.

The ///'s prototype developer – Dan Kottke - told David Craig in December 2002 about one of the serious problems Apple had not anticipated. Craig's notes indicate:

"(There was) only one serious problem, (a) mechanical connection with the III memory board that became faulty after a short period of use. Memory was implemented as a daughter board, which attached to the motherboard via two connectors (many pins each, single sided). Connectors were not gold, so when heated within a closed case they became corroded and did not transmit signals correctly. Memory signals governed the whole system timing. The fix was to use double sided gold connectors that mechanically fit better and did not corrode. The problem not noticed in the III development laboratory since systems did not have cases and there was minimal heat build-up generated. Systems run continuously the whole day."

Heat was not just a problem affecting the memory card. It turned out the chips on the motherboard would pop out during shipping or pop out of their sockets after only a few hours of on and off use (heating and cooling caused the chips to literally wiggle out of their sockets). This led to the famous "two-inch drop" where owners would pick their machine up and drop it two inches to reseat the chips.

And there were other problems - a promised built-in clock/calendar chip did not work and there was very little software (people complained "I spent $4000+ and got Visicalc and a paperweight!"). Finally, AppleWriter developer Paul Lutus wrote (October 1980) indicating a serious problem with the keyboard reset function that could cause the /// to hang.

This was a disaster in the making, since the /// was the "next generation" replacement for the II that was supposed to be a machine businesses could reliably use. Apple had to do something quickly. So every problem motherboard was replaced through June 1981, no questions asked. A number of changes were made to the motherboard and testing procedures were more demanding to decrease failure rate (June, 1981 memo from Bill Deitsch and Bob Edgington). Apple started a new publicity campaign in December to "reintroduce" the ///. The good news was that the revamped machine worked. Most of the problems were gone. But the long-term damage had been done.

In August 1981, IBM introduced its "Personal Computer" that ran an OS from a small company called MicroSoft. The PC did not meet immediate acceptance but it was helped along by the ///'s problems and IBM's name in the business world.

As 1983 began, Apple was starting to concentrate on its new Lisa computer and the Macintosh was in development – pulling away development funds. Something had to be done with the ///. Dave Fradin, the last Apple /// product manager told David Craig in May 2003 what happened:

"In early 1983 Del Yocum, who was head of manufacturing, was bothered by making only a few thousand ///s compared to making xx,xxx IIs per month. He ignored that the /// was 6x more profitable than a II. So off to Pajaro Dunes near Monterey, California and the executive committee killed the product line without consulting with the new (two weeks) /// product manager (me) or division manager.

A couple of weeks later Sculley called me into his office along with Ida Cole, Joe Graziano and Yocum and said they had $20 million in /// parts spread around the world and wanted to know what "we" should do about it. I said, "What do you mean 'we' paleface?" recalling the old Tonto and Lone Ranger story.

I told him I couldn't sell ///s because I had no authority to move the product. He asked what we should do and I recommended a separate profit and loss center with the authority to get things done. He said make a proposal and 15 of us went off and wrote an 80-page business plan, which was presented to the Executive Committee on July 15, 1983.

Later that month Ken Zerbe asked me to head up a separate division. We sold an additional $60 million in product, transitioned the 500 developers to Mac and I think preserved the value of the buyer's investment."

The ///'s official end came on April 24, 1984 – when Fradin wrote a memo to his staff saying:

"While the Apple /// is an excellent business computer, it is a generally accepted view by Apple's product managers that Apple can best serve the future needs of our business customers by expanding the Apple II and Apple 32 [Lisa and Macintosh] product families, and by concentrating future development, marketing and sales efforts on these products. Therefore, we have decided that no future product development efforts shall be initiated and undertaken for the Apple /// product line, effective immediately."

Apple removed the Apple /// line from its product list in September 1985.

Fradin says a total of 75,000 ///s were sold all together (other sources say 85,000). He told David Craig some of the other reasons that helped doom the computer:

"Part of the problem was that the /// was Steve Job's bastard child. He was the VP of product development in 1980 when it was introduced with chips that slipped out in shipping and without an operating system. SOS was not really usable for programming until early '83.

Second, as forward looking as Jobs' is, he did not want any competition in the market place for his beloved Mac. He thought the Mac was a business machine even though when it was introduced it did not have a second floppy drive, a hard disk, a letter quality printer, no accounting (package) and the largest program one could run was 10KB.

When confronted with the plans to market the Mac as a business computer and lacking the key elements, Sculley's response to the Personal Computer Systems division wide meeting was "we will market with mirrors." Mirror-based marketing worked so well that in January 1985 Mac sales dropped to 4 units, 1500 Apple employees lost their jobs and Jobs was gone a few months later."

Apple co-founder Steve Wozniak had his own take on why the /// was essentially doomed from the start. In an on-line conference dated 16 October 1983 for the CompuServe MAUG discussion group, Wozniak wrote:

"We expanded to a 2 product company with the /// and one of the downfalls was that we were too smart. We knew the proper ways to do all sorts of things and we didn't allow hackers to do things their own random ways. I feel we were wrong to believe in our 'religion', users should only use a good product (like SOS) if its better than their application, not because the company (Apple) feels only one way is right. It's a good lesson to learn. The /// is still difficult to find out how to do your own thing on."

In that December, 1984 *Byte* article he added (somewhat bitterly):

"When we came out with the Apple III, the engineering staff canceled every Apple II engineering program that was ongoing, in expectation of the Apple III's success. Every single one was canceled. We really perceived that the Apple II would not last six months. So the company was almost all Apple III people, and we worked for years after that to try and tell the world how good the Apple III was, because we knew. There is a lot to somebody's perception or image of a machine and how good it is. How many of my friends have them? How many people in the world have them? The Apple III was a failure the first year as a product - it had a bad image. When you give a bad first impression, you can go for five years trying to overcome it.

It was unfortunate the way things worked out, because we probably put $100 million in advertising, promotion, and research and development into a product that was 3 percent of our revenues. In that same time frame, think what we could have done to improve the Apple II, or how much could have been done by Apple to give us products in IBM's market."

With the /// gone, it was left up to individuals, user groups like WAP, ATUNC, TAU, AUGI and others, online bulletin board (BBS) systems including Three's Company and MAUG (Micronetworked Apple Users Group) on CompuServe, as well as a small number of vendors (On Three, Pair, D.A. Datasystems and others) to keep the flame going and they did for many, many years. Development on many excellent programs – commercial, shareware and public domain continued, as did some hardware development. They included a 512K memory card, a replacement power supply, a new version of the OS, BOS3, new drivers, (and most recently) a new card to use CF and IDE drives.

Combined with an enduring love for this computer by a group of loyal users and hobbyists, the ///'s life was extended to the point where those who purchased the machines got their value out many times over.

Here's a visual timeline graph covering the Apple ///'s lifespan. Each notch represents two months.

```
1980
   |-
   |-
   |- <--------------- Apple /// Introduced
   |-
   |-
   |-
1981
   |-
   |-
   |-
   |-
   |- <--------------- IBM PC Introduced
   |-1982
   |- < --------------- Apple III (fixed version)
   |-
   |-
   |-
   |-
   |-
1983
   |- <--------------- Lisa, Apple IIe
   |-
   |-
   |-
   |-
   |-
1984
   |- <--------------- Apple III+; Macintosh Introduced
   |- <--------------- Apple III discontinued – April 24
```
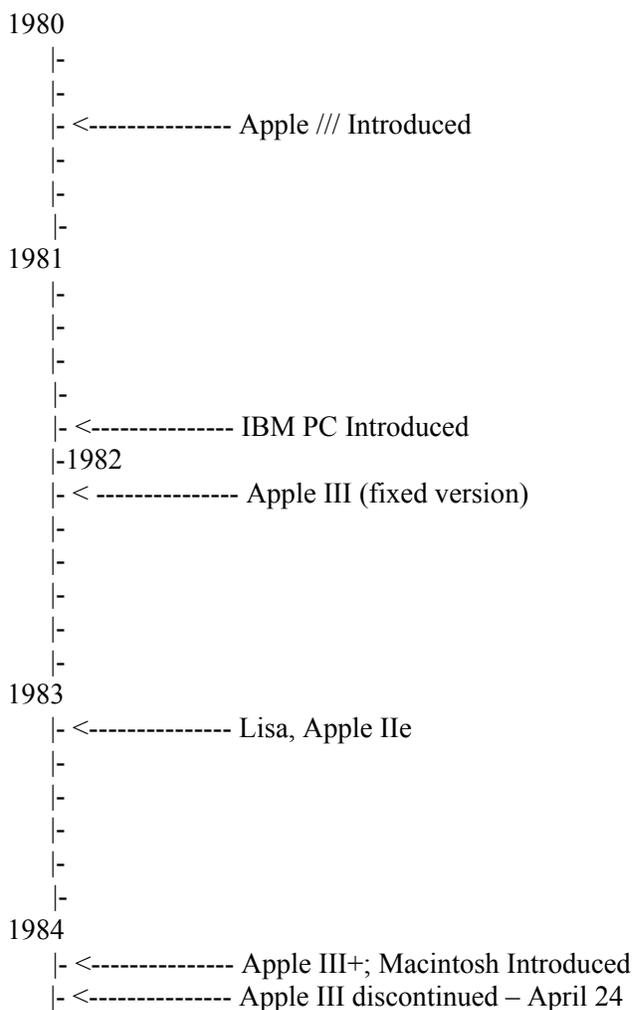
2) WHAT ARE THE ///'s CAPABILITIES?

Keyboard Friendliness

1) Arranged in a strictly traditional typewriter layout.
2) Sculptured, stepped and angled keys.
3) Numeric keypad. Recognized differently from main keyboard.
4) Software definable character set. Can be used for graphics.
5) All characters used by programming languages.
6) Dedicated cursor or arrow keys.
7) Two-key method to boot a disk without powering on and off.
8) Alpha lock key. Shift locks alphabetical keys only.
9) The entire ASCII code.
10) Automatic repeat for all keys and the speed can be tripled.
11) Can print 224 distinct characters.
12) Little bumps on D, K and 5 keys for finger positioning.
13) Numeric keypad can be redefined into 12 special function keys.
14) Dvorak American simplified Keyboard available on file.
15) 128 byte type ahead buffer.
16) Many different fonts available on file.
17) Character set can be changed under program control at any time.
18) Up to 13 control keys.
19) Computer "ON" light.
20) Two system keys, Closed and Open Apple keys redefine others.
21) 73 total keys.

3) WHAT ABOUT ITS BUILT-IN FEATURES?

1) 80 Column display.
2) 143K internal Disk drive.
3) Interface for up to 4 disk drives.
4) RS232-C. Can be made to serve six devices with a T-switch.
5) Color: All 16 colors with 192 lines of 280 dots per line.
6) Graphics: 16 shades of green with 192 lines of 560 dots per line.
7) Sound: 64 volume settings and over seven octaves.
8) Speaker: Capable of speech producing quality.
9) Monitor ports: RGB or any video device; NTSC 80 column monocrome.
10) Real time clock (location 3-B on motherboard).
11) Two Joystick ports, A&B. Silentype printer can share port A.
12) Diagnostics in ROM.
13) Audio output: SOS Audio Driver can be rewritten to your needs.
14) Built-in security mount to prevent theft.
15) 256k RAM ability, 512k potential without strain.
16) Four expansion ports.

4) WHAT ABOUT SOS - THE ///'S OPERATING SYSTEM?

1) First ever written to be user friendly.
2) Data base capabilities. Hierarchical file-structure.
3) Manages ALL memory locations and I/O.
4) One disk format for ALL allows file sharing and communication.
5) Able to share files with Apple //e; IIc and IIGS ProDos systems.
6) Easily updated without hurting existing compatibilities.
7) Ability to rewrite software drivers instead of changing hardware.
8) Will locate which drive a file is in for you.
9) Error proof menu system.
10) Automatic date/time stamping of every file.
11) Any destruction of data requires confirmation.
12) Interrupt driven.
13) Device-independent I/O.
14) Stores information using all empty space.
15) Programs that request printing could continue during printing.
16) Powerful drivers for graphics, console, audio, printer and RS232.
17) Programs can run 20% faster by pressing Control-5 on keypad (no video).
18) Uses all available memory.

David Craig Comments:

The Apple ///'s memory addressing was implemented in a very unique way. The ///'s brain was the 6502 microprocessor chip which could only address 64 KB of memory. But Apple added special circuitry to the /// so that this microprocessor could access up to 512 KB of memory. This was based on what is called "bank switching" which in effect fools the microprocessor into accessing different chunks of memory even when that memory is way beyond the normal 64 KB upper limit. The ///'s 64 KB memory was arranged into two sections with a middle section occupying 32 KB and the remainder (which itself was split) into the other 32 KB. The middle section could be replaced by up to 15 different sections or banks. This combination of 15 32 KB switched sections and one fixed section allowed the /// to have access to a maximum of 512 KB of memory (i.e. 512=32x(1+15)). (On Three did produce a card that provided that amount.)

Apple /// applications could instruct the ///'s hardware to use a specific section or bank in the variable memory area. Or, the application could use a special form of memory addressing called "extended addressing" which allowed the program to read or write a byte from any section or bank regardless of whether that section or bank was active. For example, a program could be running in bank 4 of memory and it could read byte number 1000 from bank 7 without doing any special "bank switching" operations. This "extended addressing" made the /// a very unique machine for its time.

As for the ///'s microprocessor clock speed, applications could control this. The speed could be set to either 1 MHz or 2 MHz. Normal /// operations were done with the clock running at 2 MHz so these operations would run as fast as possible. But when peripheral devices needed to be accessed, the application had to set the clock speed to 1 MHz. This was necessary since the ///'s peripheral input/output system was based on the Apple II computer's input/output system which ran at 1 MHz.

5) IS MY APPLE /// STILL USEFUL TODAY?

The Apple /// is now a collector's item. For its time, it was an excellent text-based computer with software that allowed it to do many basic (and some amazing) computing chores (it did have some graphics capabilities thanks to programs like Draw On ///). It still has one of the best keyboards ever made for a computer. It can do basic word processing, spread sheet work, and some graphics. For many years, it could do text-based Internet and email as well). For collectors, it is still a fun machine to own. Some ///ers continue to use and enjoy the machine! In fact, users all over the world continue to buy disks, so someone is still turning our SARA on occasionally. Look to eBay or other auction site for sellers. They are out there. In fact, you can still find new software in shrinkwrap if you look! Amazingly, there are folks still writing drivers for such things as the Apple II CFIDE card (see below).

6) WHAT OTHER HARDWARE/SOFTWARE DO I NEED TO MAKE MY /// A COMPLETE SYSTEM?

a) A second 5.25 inch disk drive. It speeds up your work considerably, makes it easier to load and save data, etc. The /// can also use the: 1.4 MB Apple II Superdrive and 800k Unidisk (using Apple // interface cards and On Three drivers) and many hard disks (Profiles and SCSI). On Three sold a Universal SCSI driver from On Three in 1996 that, with the proper interface card, gave /// users access to the Syquest EZ Drive and just about all SCSI-based hard drives (one notable exception is the Iomega ZIP Drive). Pascal programmers should use a Profile or 4 disk drives.

b) System Utilities disk. This program lets you copy files, format disks and configure your SOS.Driver file (WAP PD disk 3UTL-02).

c) /// EZ Pieces. This is an excellent integrated software program that is easy to learn and use. Its files are also compatible with the Apple // version called AppleWorks. (3APL-07)

d) Printer. You can run a printer (from eBay or other source) off of the RS232 port in the back of the /// or by using a Serial or Parallel card you plug into one of the four slots internally. To connect your serial printer to the /// you will need what is called a Null-Modem cable. Local computer dealers and national chains like Radio Shack used to sell them. These days you'll need to check with your local user group or a company like Sun Remarketing or Shreve Systems that still sells Apple II parts. eBay or other online reseller is also a viable source of older serial or parallel printers.

You will also need specific device drivers you have to install in your SOS.DRIVER file using System Utilities. The Apple /// DVD includes the Apple /// PD library that includes a disk full of /// drivers (3SYS-07). The /// can print to laserprinters (with serial ports) as well as dot matrix printers, but does not have access to inkjet printers (no drivers!). Note the Apple /// has no USB capability. BUT you can save your files to disk and print from a II or GS, or via transfer, to a Macintosh or PC.

e) A surge protector to prevent electrical surges from destroying your machine.
f) Dust cover to help keep things clean.

7) WHAT'S THIS ABOUT "SOS"?

As mentioned earlier, the Apple /// uses an operating system called SOS, or Sophisticated Operating System. It is entirely ram-based. That means every time you load an application, it loads the operating system as well. You will find three files on all program disks: SOS.Kernel; SOS.Interp and SOS.Driver. The KERNEL is the operating system itself. You want to make sure you have the latest version: 1.3. You can tell what version you have when you boot up. You will see a message that tells you the version along with the Apple copyright. You can get an auto-upgrade disk from WAP – ask for disk 3SYS-01. Check Apple's SOS data sheet from March 1982 for a good overview of the OS – titled *Apple /// Sophisticated Operating System.*

The INTERP file is the language the program uses or it may be the program itself. Applewriter, Basic and Pascal are examples of SOS.Interp files you will find. Finally, the DRIVER file (SOS.Driver) contains the drivers that enable the /// to talk with your printer, disk drives, modem and hard disk properly. At the minimum you will need the console driver, called ".Console" and you might find others: ".Printer" to drive your printer; ".RS232" operates the RS232 port or a serial card for telecommunications; ".Audio" lets your /// beep and play music to you; ".Grafix" is the graphics driver. There are many more. You install these using the System Configuration Program on the System Utilities disk. In most instances, you want to make sure you have the 1.3 versions of the drivers installed (WAP /// SIG SOS Drivers PD disk: 3SYS-07)

There were four total versions of SOS:

1.0   - October, 1980
1.1   - September, 1981
1.2   - January, 1982
1.3   – November, 1982

8) WHAT IS BOS3?

BOS3 is a wonderful upgrade to SOS, released in December, 1994. Developed by Bob Consorti, it was financed entirely by the Apple /// community (the Software Development Fund). BOS3 adds a tremendous number of capabilities to the /// with a hard drive or even a 3.5" (Liron) drive. They include an easy to set-up and use menu system, disk caching, password protection, screen saver, macro capability to run programs with just two keystrokes and compatibility with Selector /// pathnames. Contact Dave Ottalini about BOS3 at apple3info@verizon.net.

9) WHAT ABOUT APPLE II EMULATION MODE?

Your /// can operate as-is in an emulation mode to make it think it's a 48k Apple //+ (WAP has the emulation software: Disk 3EMM-01). Titan made a ///+// card for the /// you might also be able to find - it increased memory up to 128K in //+ emulation and offered a RAM disk in native mode.

You might also be on the lookout at computer garage sales or on eBay for the "Titan ///+//e" - a set of two-cards that really turns your /// into a 128k //e. You'll want to add a 65c802 CPU (in place of the 6502) to ensure compatibility with newer Apple // programs (it has no effect on native mode applications). The cards offer a RAM disk in native mode as well. (WAP has a wonderful set of RAM drivers for these cards - disk 3DAD-10).

David Craig offers a detailed document describing some details about emulating the Apple ///. Contact him for more information at: shirlgato@cybermesa.com.

10) WHERE DO I FIND INFORMATION ABOUT THE APPLE ///?

* Apple /// DVD

Released in February 2007, the Apple /// DVD is one of the best sources for Apple /// information ever assembled. Info about the DVD is on the apple3.org website. It is available from Washington Apple Pi's webstore at http://www.prestostore.com/cgi-bin/storefront.pl?ref=WAPiStore

* World Wide Web:

As you might imagine, there are a number of websites dedicated to providing information about Apple Computer and the complete line of machines they have produced over the years.

The /// Community has created a website – http://www.apple3.org that is a holding site for many files for download.

Washington Apple Pi maintains an Apple /// web site - http://www.wap.org/a3/default.htm. Most of its files, including the /// PD library, can be found on the newly released Apple /// DVD.

There are also a ton of web sites, so do a search under "Apple Computer History" and have fun searching. Here are a few possibilities for you (more are listed later):

http://www.vintage-computer.com/apple_iii.shtml
http://digibarn.com/
http://www.archaic-apples.com/
http://oldcomputers.net/index.html
http://www.apple-history.com/
http://www.apple-history.com/frames/?&page=history&section=h1

/// USER GROUPS

As mentioned above, Washington Apple Pi maintains a number of Apple /// materials – now in the form of the Apple /// DVD. A separate two-set DVD includes the entire "How To Use Your Apple /// in 10 EZ Lessons and some videos and other material are available now for $30.00 from the Pi. WAP's address is:

Washington Apple Pi
12022 Parklawn Drive
Rockville, MD. 20852
(301)-984-0300
www.wap.org

* Apple /// Discussion Group

If you are interested, there is still an Apple /// discussion group. To subscribe, send a message to majordomo@altair.com with the text: subscribe apple3-l in the body of your message.
You'll get info back at that point. Send comments or suggestions to: jeff@altair.com.
(THANKS to Jeff Fritz at West Virginia University for hosting this Listserve for many years.)

---

11) WHERE CAN I FIND PUBLIC DOMAIN SOFTWARE?

WAP now offers its entire /// PD library in Apple Disk Transfer files as part of the Apple /// DVD (thanks to David Craig for the transfer). Actual 5.25" disks are no longer available.

The categories for the Apple /// Public Domain Library includes:

Accounting; Apple Software; Appleworks/3EZ Pieces templates; (Dr. Al) Bloom Programs; Business Basic; Catalog; DA Datasystems Programs; Emulation, Fonts, Games, Graphics; Internet; Miscellaneous; Pair Software; Pascal and other Languages; Repairs; Shareware; Source Code; System Software; TeleCommunications; Utilities; WAP Articles and Word Processing.

There are also some FTP sites that continue to offer some Apple /// software. The best one is at: ftp://ftp.apple.asimov.net/pub/apple_II/unsorted/

12) ARE THERE STILL SOURCES FOR HARDWARE AND COMMERCIAL SOFTWARE?

The best place these days is eBay or other online auction site or the Apple /// Listserve mentioned above. The /// has become a collectors item and folks are offering up hardware and software all the time. It is amazing to see what the prices are at times – hard-to-find hardware or software can fetch a decent price considering. Collectors routinely look for extra machines to use for parts. Some folks have also had luck at Goodwill and other similar stores.

13) WHERE CAN I GET MY APPLE /// REPAIRED OR FILES CONVERTED?

There are no vendors left that do Apple /// repairs. Individual owners have had to become resourceful when making repairs. If you have problems, contact the author directly or try to find a collector in your area who still has some experience with the ///. Check with the Apple /// listserve for help. Anyone wishing to be listed as a /// resource here please contact the author.

Similarly, there are still ///ers out there (including this author) willing to help convert Apple /// files to Mac or PC. Contact the author of this FAQ for more information.

**14) WHAT ABOUT AN OUTBOARD POWER SUPPLY FOR THE APPLE ///?**

Many years ago, Washington Apple Pi worked with Dr. Stephen Buggie to developed a new, cheap power supply for the ///. This was an outboard power supply, originally made for use in PCs. It worked great and supplied ample power for the /// and four slots worth of cards. The cable from the new power supply snakes into the /// from the back through the Slot 1 opening. It did NOT prevent the use of a slot one card. There's some information about this on the Apple /// DVD.

The price at the time was $27.00 plus $5.00 postage to Dr. Buggie.

Stephen Buggie, Ph.D. (buggie@unm.edu)
Dept. of Psychology/ED.
Univ. of New Mexico
200 College Rd.
Gallup, NM 87301

15) WHERE CAN I FIND THE PINOUTS FOR AN RGB MONITOR?

Apple published a circuit for this in the ///'s Owner Manual (Page 135- Appendix C) but it is wrong! On Three published the correct circuit as part of its Draw On Three manual (but the quality is poor and not readable via scan). The Draw On /// program disk has an image – but we've also scanned it for you below. D.D. Meisel published an article about this – "A New RGB Circuit for the ///" which is available on the Apple /// DVD.
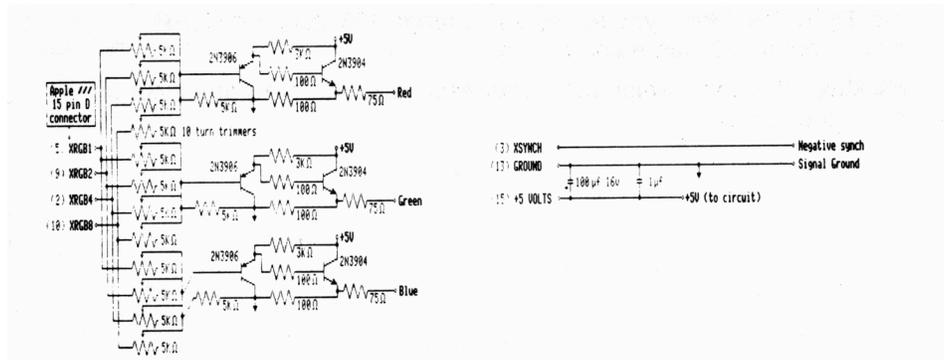
16) ARE THERE ANY APPLE /// NEWSLETTERS OR MAGAZINES LEFT?

There have been no Apple /// magazines or newsletters for many years, but some user groups still publish articles on occasion – usually online. Internet sites listed in this FAQ offer articles and resources for users and hobbiests, including the posting of comments. The Apple /// DVD contains an archive of articles from many user groups over two decades or so.

On Three published an excellent magazine that came out for years. It provided a wide range of reviews (usually of its own products), beginners' tutorials and a letters section. Back issues are no longer available.

17) WERE THERE ANY APPLE /// BOOKS?

Only a few books were ever written about the Apple ///. There are three specific books worth mentioning:

The Osborne/Mcgraw Hill Guide To Your Apple /// is the first book on the list. The other two are by Eddie Adamis: Basic Keywords for the Apple /// and Business Basic for the Apple ///. The Guide covers only the Apple /// and not the Plus version. The author is Stanley M. Miastokowski.
It's a good, beginning-level text for new /// owners and good to have for us older SARAsaurs who've had their machines around for a while. It has a good overview of Business Basic and sections on the .Audio and .Grafix drivers that are excellent. WAP is trying to get it placed into the public domain.

The Adamis texts are straightforward, no-nonsense books that essentially describe Business Basic version 1.1, its key words and provides examples.
The only other ///-specific book on the market at one point was *Using Apple Business Computers* by Kenniston Lord Jr. It discusses Business Basic from a number of perspectives and includes lengthy Basic programs for business users.

All these books are now out-of-print. But you may still be able to find them at a used bookstore or through eBay. A growing number of computer museums, like Digibarn.com are also compiling all the Apple II

and /// books, manuals and magazines they can, so do a Google search to track them down. The Osborn-McGraw Hill book has been scanned and is available on the A3CD now available from WAP.

There are also a number of excellent books that discuss the history of Apple Computer, including the Apple ///. Check Amazon.com or other bookseller.

18) WHAT ABOUT TECHNICAL MATERIALS?

Apple produced a /// Service Manual that includes schematics, information, service tips, etc., along with a host of Technical Notes. The manual is now on the Apple /// DVD.

The Apple /// Tech Notes are available on Apple's Technical Information Library (TIL) at http://search.info.apple.com (search for "Apple III" and mark the pre-1997 checkbox). These are also available as part of the A3 DVD.

There are many more manuals from Apple and third party vendors. Apple produced a series of repair manuals while Sun Remarketing produced a booklet in 1987 that covered repairs. Three's Company BBS had extensive repair information from users. The Apple /// PD library offers a series of disks aimed at helping repair your /// from many sources, including Apple's own diagnostic disks (all on the Apple /// DVD.)

David Craig has about 600 pages of Profile service and theory information if you are looking for help on this Apple /// hard drive. He also has a comprehensive set of schematics and other information.

Apple offered comprehensive technical manuals for Business Basic, Pascal (The A3 language of choice), COBOL and FORTRAN. A version of Forth (called "Go Forth") was developed by Stephen Smith and distributed by Frank Moore's Pair Software (again see the Apple /// DVD).

Again there are also online resources, like http:www.apple3.org that offers various manuals and other resources.

19) WHERE CAN I LEARN MORE ABOUT 6502 MACHINE LANGUAGE?

The WWW has become a godsend for anyone who wants to learn about programming in assembly code and older computers like the Apple ///. One online book to look at is called
"Machine Language For Beginners" by Richard Mansfield at http://www.atariarchives.org/mlb/.
A great site for 6502 programming is www.6502.org. Beyond that, a quick Google search will turn up many sites that offer great resources for budding 6502 programmers.

20) WHAT KIND OF COMMUNICATIONS SOFTWARE WAS AVAILABLE?

There were a number of communications programs produced for the Apple /// over the years, but there are three generally considered to be the best:

a) Access /// Interp Version: An excellent assembly-language terminal program that can provide VT100 emulation. Scripts at the time could be used to automate log-ons to CompuServe (now a part of Netscape) and other on-line services. It does NOT offer Xmodem protocol. It is available in the WAP /// SIG PD library as disk 3TEL-02 (Apple /// DVD) (which includes an excellent Apple /// communications tutorial).

b) XMODEM /// is also in the WAP PD - an excellent stand-alone telecom program that offers the user XMODEM Protocol for error-free downloads and uploads. In the WAP PD it's disk 3TEL-05. Manual is on disk.

c) The Communications Manager was a program from On Three that is no longer available commercially. It is the best /// communications program ever produced and offers a host of features, including XModem and turbo downloading capabilities. It could be run as a stand-alone program or as a Desktop Manager module.

Please see the Apple /// Communications FAQ (by Al Bloom and others)(on the Apple /// DVD) for more details about telecommunications on the Apple ///.

21) WHAT ABOUT MODEMS?

If you want to try using a modem on a ///, you'll need to track down an older unit with a 25 pin serial connector. Any one will do, but the terminal programs above have settings that only go up to 9600 baud. Your best bet is to use a 2400 baud or 14,400 baud modem - they will work fine and are very inexpensive (get one at a computer garage sale or your local user group like WAP).

22) CAN THE APPLE /// ACCESS THE INTERNET?

Although the /// was able to access text-based Internet providers (CapAccess - http://www.capaccess.org/ - comes to mind in the DC area and the early versions of CompuServe, etc. as well as various UG dial-in services) in the early days, this is just not possible now.

23) WHAT DOES IT TAKE TO SURF THE INTERNET WITH THE ///?

Please see the old *A3 Internet FAQ* (Apple /// DVD) for what now is historic information. Basically, the /// can't surf the web of today.

24) WHAT WAS THE APPLE /// SOFTWARE DEVELOPMENT FUND?

Established by Washington Apple Pi in the early 1990s, the SDF was used to fund specific software projects for the ///. Through donations and contributions from WAP and ATUNC (the now defunct Apple Three Users of Northern California), the SDF helped fund the development of a Superdrive driver and BOS3 - the first upgrade to SOS in some 10 years. Other projects included a universal SCSI driver that works with the Syquest EZ Drive and most all SCSI drives (but required a specific and hard to find SCSI interface card to work) (one notable exception - the Iomega ZIP drive did not work because of the way it was built) and a replacement outboard power supply.

25) ARE THERE ANY APPLE /// WEB SITES?

WAP continues to support the /// online at http://www.wap.org/a3/. There is a lot of Apple /// information, along with a searchable database of Apple /// articles going back to its earliest years. As mentioned above, http://www.apple3.org is a growing information repository.

There are a growing number of sites that look at the history of the /// in the broader context of Apple Computer history or the history of computers in general. A search of Google, Yahoo or other search site brings up a number. Here are some that you might find of interest (in no particular order):

en.wikipedia.org/wiki/Apple_III
www.apple-history.com/aIII.html
www.digibarn.com/collections/systems/appleIII/
www.vintage-computer.com/apple_iii.shtml
www.oldcomputers.net/appleiii.html
www.fortunecity.com/marina/reach/435/aiii.htm
www.cyberstreet.com/hcs/museum/apple3.htm
www.wordiq.com/definition/Apple_III
www.fact-index.com/a/ap/apple_iii.html
www.apple2history.org/history/ah07.html
www.tonh.net/museum/apple3.html
www.total.net/~hrothgar/museum/AppleIII/
www.syssrc.com/html/museum/html/apple3.html
www.allaboutapple.com/museo/reportages/apple_iii/apple_iii.htm
http://lowendmac.com/b4mac/appleiii.html
http://lowendmac.com/orchard/05/0516.html
http://lowendmac.com/coventry/06/0901.html
http://www.old-computers.com/museum/computer.asp?c=72
http://www.mandrake.demon.co.uk/Apple/appleiii.html
http://www.answers.com/topic/apple-iii
http://www.macobserver.com/columns/thisweek/2004/20040522.shtml
http://www.dvorak.org/blog/?page_id=8220

26) WAS THE APPLE /// EVER USED AS A PROP IN THE MOVIES?

Yes – as fans of the Disney movie Tron probably already know! Take a look at http://www.cedmagic.com/history/tron-apple3.html for more information. Here's the picture:

---

27) What About A Poem – Was One Ever Written About the ///?

Thanks again to David Craig for passing this along:

THE LAND OF ORPHANED FAMILIES
by Steve Fleming (c. 1980s)

There was in this great world of ours,
The greatest kingdom ever known.
Its name was simply "Computerdom",
And thousands called it "home".

Now this kingdom was divided,
By beliefs and values and cash.
"Apple" and "IBM" were two of the groups,
And often would they clash.

But this is not my story,
For my story has to do
With a few small families in "Apple"
Called "///" and "Mac" and "][".

Now "][" was doing very nice,
And he had a bit of land.
He called his three estates "+", "c", and "e",
And the ruler of "Apple" smiled upon this man.

The "Macs" were new in town,
They had quite a bit to do.
They weren't sure they'd make it,
Being next door to "][".

And now I come to the saddest group
Of all those in this land.
The family called "///" had tried,
But could not make their stand.

The ruler of "Apple" had not liked them
Since they first began.
He said they caused him trouble,
And cost him money and food and land.

But the family "///" was a hearty bunch,
And they would not give in.
They worked through jeers and laughs,
And looked with hope to their kin.

The "///+"'s had just moved in,
But they were not doing well.
But together they worked and waited,

And feeling of hatred swelled.

Then early one morning,
The horrible news arrived.
The ruler of "Apple" was going to
Sending food and tools and supplies.

But some wealthy families nearby
Saw their plight and said,
"This is a very good family,
They deserve money and tools and bread."

So with the aid of these rich families,
The "///s" began to thrive.
And the "family that would not die"
Began slowly to climb.

And one day soon thought they,
We will be strong enough
To take over "Apple",
And do to them what we must.

28) IT'S THE 21ST CENTURY! WHAT'S NEW WITH THE ///?

Apple /// DVD: Washington Apple Pi's compilation of all things Apple /// was released in late February 2007. It includes a tremendous number of articles about the ///, pictures, audio files, the WAP PD library and more. Check the online store at www.wap.org for availability, cost and information.

Project CFFA: Believe it or not, there's an Apple II card that provides a CF (Compact Flash) and IDE hard drive interface that works in the ///. A driver is available that makes it all possible. Goto http://dreher.net/?s=projects/CFforAppleII&c=projects/CFforAppleII/main.php

       Apple /// DVDs: Washington Apple Pi has developed a two set DVD with all ten chapters of the "How To Use Your Apple /// in 10 EZ Lessons" (1-5 on DVD1, 6-10 on DVD2) VHS tape. There are also a number of Apple /// iMovies – which honor On Three and discuss the Apple /// horses animation. Photos and some A3 information is also on these disks. Check www.wap.org for more information.

29) I Want More Information About the ///. Where Can I Find It?

David Craig was kind enough to compile some resources for you!

For introductory descriptions of the Apple /// computer family Apple produced several short publications:

The Apple /// Personal Computer System (May 1982)
The Apple /// Plus Personal Computer System (Nov 1983)
Apple /// System Data Sheet (Jul 1983)
Apple /// Plus System Data Sheet (Oct 1983)
Apple also published many data sheets describing specific hardware and software pieces for the /// which included SOS, floppy disk drive, ProFile hard drive, programming languages, and Apple's /// applications.

For independent reviews and discussions about the Apple ///computer see the following articles:

Computer reviews and introductory information:
The Apple /// (BYTE magazine, July 1980)
The Apple /// and its New ProFile/// (BYTE magazine, Sep 1982)
An Apple /// Guide for Humans (Apple Orchard, Sep 1982)
The Apple Nobody Knows (Apple Orchard, multi-part series)
Using SOS (Apple Orchard, Mar 1984)

Histories:

Fire in the Valley: The Making of the Personal Computer (Freiberger, 1984)
The Little Kingdom: The Private Story of Apple Computer (Moritz, 1984)
West of Eden: The End of Innocence at Apple Computer (Rose, 1989)
A Family for the III-Plus (Softalk, Jan 1984)
Apple Confidential (Owen Linzmayer, 2003)

(Linzmayer's Apple /// history chapter, "The Apple III Fiasco", is in David Craig's opinion the most comprehensive and accurate history of the Apple /// computer. If you read one history of the /// make it this book (it also has great information about other Apple computers such as the Macintosh and Lisa). Owen sells this book directly from his web site at www.owenink.com. An earlier version of this book called "The Mac Bathroom Reader" also has great Apple /// information.)

Technical overviews:
III Bits: John Jeppson's Guide Tour of Highway III (*Softalk*, May 1983)
Software Developers and the Apple /// (*Apple Orchard*, Winter 1981/1982)

Apple /// Applications:
Will Someone Please Tell Me What an Apple /// Can Do? Sep 1983, 96 pages
Resource Guide for Apple /// and Apple /// Plus Software and Hardware
May 1984, 98 pages

30) OK - I'M STUMPED - WHAT IS A SARASAUR?

Anyone who still loves the Apple /// as a great computer! That includes folks all over the world - from Japan to Puerto Rico, Washington DC, Detroit, the San Francisco Bay area and many places in between. We invite you to join us!

31) WHAT DID USER'S CALL THE ///?

"THE MACHINE THAT WOULD NOT DIE!"

###