# PrintScreen

**The Newsletter of Stanford/Palo Alto PC User's Group**

**C•O•N•T•E•N•T•S**



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# HEWLETT-PACKARD

## LaserJets and InkJets

Wednesday, July 27th,
7:30pm at Varian, Bldg. 7 Auditorium

# The President's Piece

Walk to

Your phone and most gloriously sing out to Jim Bailey (415) 494-0631 (Print Screen Distribution Mgr.) that you have an hour to share with SPAUG. WARNING, this is not a paper route. The highly acclaimed Mailing Party happens in Jim's Palo Alto kitchen. Over a flurry of jokes, brilliant repartee, and knowledge exchange the "fresh-off-the-press" newsletters are labeled, stamped, and sorted for mailing. Give him a call now and keep Print Screen rolling.

The Great DOM...

Larry Weinberg whipped up a great Disk-of-the-Month for the June meeting. If you missed his two set extravaganzas then tell him about it at (415) 969-2292. While you are chatting, mention a title or subject that you would like to see him assemble for a future DOM.

Caere gazing...

I have seen the future and it's 16 megabytes of main memory. My 8 meg innocence shattered as I reach for my credit card. The new status symbols: 4 meg SIMMs and a scanner. Jen Gilburg thoroughly impressed a very well attended meeting when she scanned and OCRed an entire page of text in about one minute. She was running a 486/33 with 16 megs, OmniPage software and a HP scanner. It sure beats typing and trying to draw a graphic. The Caere Special User Group Pricing is 50% off the SRP. Example, the Personal PageKeeper SRP is $195 and the User Group Price is $99. Their phone number is (800) 535-SCAN.

Survey sez....

Yes, we had another membership survey at the June meeting. The issues were BBS upgrades and the Sidewalk Faire. A new, faster modem, a second CD drive, and a back-up hard drive was all approved. Everyone loves the Sidewalk Faire but Committee participation is lagging. That issue died at the Planning Meeting.

The Resource Center page

Was redesigned to make room and recognize the outstanding volunteers within SPAUG. Check out the inside back page. Don't be shy, call today and volunteer to help SPAUG.

Free Drawing Winners

From the June Meeting are: Bev Altman - PageKeeper, Don Campbell - Teacher in a Box, Charles Brown - Ami Pro, Bob Hoffman - Maximer Lite, Sid Felix - Virtual Monitors.

See you at the HP printer presentation on July 27th.....Brian

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**DISK OF THE MONTH INVENTORY - 7/94**

Code: S=shareware, F=freeware, D= DOS, W=windows, (N)= number available

Prices:1994 disks and later - $1.00, earlier than 1994 - $0.50
specials as noted

| | |
|---|---|
| 9207 SDW | HyperDiskv4.32 Disk Cache. |
| 9209 SD | Scn, Clean, Vshield Virus protection |
| 9306 SDW | Cedar Island Link- great telecommunication program |
| 9307 SD | Procomm 2.43- popular communication and PKZ 2.04g compression standby |
| 9401 SW | Games ( Craps v1.2 and Mima262) ; VBRun 100,200 and 300 |
| 9402 SW | Games ( 15 )- Poker, Checkers, Klotz, Taipei and more |
| 9402 SD | Internet Information plus games and utilities |
| 9403 SW | Xargon, Winsaw, Laugh, Quotes, Wowspill, Jn1s |
| 9404 FDW | CMOS_RAM, Screen capture, Winexit, Freemem, lots of freeware |
| 9405 SW | SPAUG BBS Windows file index |
| 9406 SFW | Selectins from Brian Livingston's "The Best in Windows Shareware" from Windows 3.1 Secrets<br>5 shareware, 7 freeware<br>2 DISKS - $1.00 |
| 9407 SW | 11 Files from SPARC, SPACE and AOL( Merc Center) blackout,ddp20,diskfac1,ezboot20,fish3,gped, toolqb20,windu12,windupe,winload,wnvel41 |

## *Intel's 486 Fosters New CPUs*

*by Jan Fagerholm*
*Copy Editor* - PCC News
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In the Good Ol' Days way back eighteen months ago, choosing a new computer was easy. Used to be, you could walk into a computer store and ask, "How fast?" The vendor would then reply, "how much money you got? " and then you would wrestle to a price/performance relationship that you could live with. These days, that approach is likely to send you home with some serious shortcomings that you will not realize until you try out your shiny new Four86 Flashbox on your stuff. The purpose of this article is to try to sort out some of the surprises.

These days, the sweet spot in the market is the 486 machines. The surge of 486 compatible CPUs in the last year has driven down 486 PC prices faster than expected. You may be preparing to snatch a new system off the shelves, but have been dismayed at the confusing and conflicting claims about different 486 CPU clones. If you are overwhelmed, or even just whelmed, by the microglut of models, stick around—there is hope (and even information) to be had here.

While all the thunder in the CPU market is from the Pentium, all the action in the market is with the 486 CPU and its clones. The 486 market has fragmented in a fashion not seen before on silicon shores. While it is common marketing practice to offer many model variations on a product in order to broaden its appeal, this is not always appropriate to technical markets as the demand is usually well defined. As PCs become commodities, though, manufacturers are face with the same dreary problems that toaster makers face—how do you make your product stand out in a sea of workalikes?

Intel has done its level best to avoid taking part in this type of market, largely by being first with the technology and close behind with the patents, to see that they could sell it long enough to recover research costs and make some money. This over simplified interpretation of their strategy is not as cynical as it appears when you look at the fact that the Pentium follows Intel's historical product cycle of bringing out a new class of CPU every 44 months, going back ten years.

AMD's tenacious grip on their right to use Intel microcode in their CPUs is legendary, and they have nibbled at Intel's turf ever since the days of the 80286. Others, without access to Intel's microcode have been more cautious about spending the megadollars required to reverse engineer Intel's products without accidentally creating patent infringement. Intel has proven less aggressive about suing people over their "older" technology, though, so several silicon shops have taken the plunge into making workalike 80386s and 80486s.

Entering an established market with a "me too" product is not the same as creating a new market (which is what Intel does), so these companies bring a lot of market thinking into their development cycles. As a result, last year saw a dizzying array of 486 CPU clones and compatibles with a confusing array of feature sets/subsets, and blurred by nearly identical monikers to create the impression that these are really 486s no matter what Intel says. Closer examination, as may be expected, reveals that these claims range from pretty accurate to pretty deceptive. [Marketing claims are made in the PC business that put you in jail in any other business, because PCs are a new business and a technical business which the law does not understand yet.]

CPUs Arranged by Increasing Performance

| Mfr. | Model | Bench | Description |
|---|---|---|---|
| Intel | 486SX/25 | 17.0 | 32-bit internal, no FPU, 8 KB cache |
| IBM | 486SLC2/50 | 18.0 | 16-bit data, 24-bit addr, no FPU, 16 KB cache |
| Cyrix | 486S140 | 21.0 | no FPU, 2 KB cache |
| Intel | 486SX/33 | 23.0 | 32-bit internal, no FPU, 8 KB cache |
| IBM | 486SLC2/66 | 24.0 | 16-bit data, 24-bit addr, no FPU, 16 KB cache |
| Intel | 486DX/33 | 24.5 | 32-bit internal, 8 KB cache |
| IBM | 486SLC2/80 | 27.5 | 16-bit data, 24-bit addr, no FPU, 16 KB cache |
| AMD | AM486DX/40 | 28.0 | 32-bit internal 8 KB cache |
| Intel | 486DX2/50 | 32.0 | 32-bit internal, 8 KB cache |
| Intel | 486DX/50 | 35.5 | 32-bit internal, 8 KB cache |
| Intel | 486DX2/66 | 39.9 | 32-bit internal, 8 KB cache |
| Intel | Pentium/60 | 73.3 | 64-bit internal, scalar architecture |

Now that Intel is pushing the Pentium as its product, the 486 has slipped into the "mainstream." This is highlighted by Intel 80486 sales in the last year, and the variety of 486 class CPUs now available.

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## *Video Basics*

*by Bob Haggerty, DVPC*

Diablo Blue

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In pursuit of microprocessor speed, only a limited number of stratagems can be applied. The processor can be run at a faster clock rate, the register width can be made wider, or processing tasks can be shared. It is much the same with the video subsystem. As you might expect from the three options above, buying the fastest processor will provide an improvement in video speed but it might not provide the biggest bang for the buck. This article will lay out in a few installments how the video subsystem functions, from basics of MDA to the more advanced concepts of VLBus and BitBus.

### *IN THE BEGINNING*

In the beginning the great Blue Father said "let there be light " and there was, and it was green. The first standard set by IBM was the MDA or Monochrome Display Adapter. In the original IBM version this card output to a display that used a long persistence phosphor (for reasons that will be covered later) that glowed in ghostly virulent shade of green. The characters it displayed were crisp, and were not equaled until VGA made its arrival several years later.

In a world where a PC1 might he purchased with as little as 16KB of memory, one or two megabyte video cards were out of the question. Drawing a screen pixel by pixel as a normal method of displaying text would not be attempted until the Apple Macintosh made it's debut a few years later. When it did debut, this pixel by pixel method of display (known as bit mapped graphics) made the Mac S...L...O...W. It was slow principally because much of the Mac's processor power was squandered in drawing the screen. How then did the PC manage such relatively crisp response? The answer is use of a *character mapped display*. When you fire up DOS or use a program like Word Perfect 5.1 for DOS, your video system is working in character mapped mode. Almost all video cards have backwards compatibility in order to prevent programs from being orphaned as technology progresses. Imagine if you fired up your new Acme Super Screenblaster and found it would not work with your tried and true DOS scheduler program. Hardware manufacturers realized this and knew if they wanted to sell their video cards they would have to be compatible with previous operating modes - in other words, provide backward compatibility.

The character mapped display was essentially the only means of displaying text on the PC for the first several years of its existence. In the most common implementation the screen is divided into a matrix of locations or boxes on the screen: 80 across by 25 high. Each box has a corresponding location in memory where a code is stored to determine what character will be displayed in that box. The actual shape of the displayed character has no relationship to the stored code. The shape is determined by a special section of memory located on the video adapter card called character ROM. If for instance the ASCII code for the letter "A" was sent to the video adapter the code sent would be 41 Hex or 0100 0001 in binary. Not much likeness to an "A" here. When the code reaches the character ROM the pattern it represents is looked up. It is this stored pattern that is in turn sent to the monitor. Since everyone has agreed to use ASCII (American Standard Code for Information Interchange) the correct character is displayed regardless of the computer or program in use. If another code such as EBSIDIC (a proprietary IBM standard used mostly on mainframes) were sent to the video adapter, the result would be an electronic equivalent of the tower of babble as the two systems would be speaking two different languages.

The great advantage of character mapping is its efficient use of memory. Filling an entire page (80 characters across by 25 lines high) uses only 2 000 bytes. That is 2 000 "boxes" in the screen's matrix and each box is filled by any of 256 possible characters (defined by 1 byte or 2^8 = 256). Actually one page (a screenfull) of text requires 4,000 bytes as the MDA assigns 2 bytes to each character. The even-numbered byte carries the ASCII character value and the odd-numbered byte carries the display attribute. In the MDA's only concession to a display frill it determined whether the character was normal or high intensity, reverse video, blinking, or underlined.

Just as ASCII defined the standard for encoding characters, a de facto standard evolved for the exact location of each screen memory address. At first IBM refused to make the video addresses an official standard but programmers found they could only get acceptable speed by directly manipulating memory in this character based mode. When the industry became reliant on these addresses even IBM could not change the unofficial standard. IBM BIOS provided a special flag (an indicator to signal software function) at an absolute address memory location 0463 (hex) when the value at this location is 0D4 (hex) the system is running in color. When the value of the flag is set to 0B4 (hex) the system is running in monochrome mode. Color uses a chain of addresses starting at 138000 (hex). Monochrome uses addresses starting at B0000 (hex). When the text is to be displayed. A program will load the appropriate ASCII code into the memory location corresponding to the location in the X0 by 25 matrix of character boxes. The display system reads the entire matrix and translates it into a serial data stream that is scanned across the monitor screen moving the data to the video output.

Each character on the screen is composed of a grid of dots which is essentially a matrix of dots within the larger matrix of characters. Called a character box, the layout and number of dots differ with each standard. In the monochrome MDA each character is composed of 9 dots across by 14 dots high. The other popular standards were the Color Graphics Adapter (CGA) with a character box of 8 by 8 but a limit of 4 colors on screen simultaneously; the Enhanced Graphics Adapter (EGA)

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# Multimedia PC Computing
# A User's Guide to Hardware and Operating Systems

Microsoft Corp. publication



## What is Multimedia PC Computing Today?

Multimedia PC Computing is not just a vision for the future: it's here today. Multimedia PC Computing is a simple concept. It integrates sound, animation, and photo-quality images with text and graphics. Yet this simple idea will have a remarkable impact on the way people use computers. Multimedia PC Computing offers a whole new way to experience information. It offers:

• *Many mediums*

We perceive the world through all our senses, and we receive information particularly well through our eyes and our ears. That's why Multimedia Beethoven: The Ninth Symphony is accompanied by the actual music. And Microsoft Bookshelf CD-ROM reference library explains how the ear works with an animation of how sound waves enter the ear and how the parts of the ear respond.

• *Interactivity*

Easily navigate through titles and intuitively explore and respond to text, related articles, images, charts, maps, music, and animation, following your own thought processes and associations.

• *Breadth and depth*

By using CD-ROM discs that can hold up to 600 megabytes of information—nearly 100 Bibles' worth—you can access vast quantities of information entirely and conveniently from their PC.

• *A whole new reason to buy a home PC*

Many people have resisted purchasing a home PC because the benefits provided by today' s applications software are not impressive enough to warrant the investment. However, multimedia PC-based reference, education, and entertainment titles provide a compelling reason to buy a PC.

## How You Get It

**Windows 3.1**

Multimedia becomes mainstream with Microsoft Windows operating system version 3.1. Windows 3.1 supports multimedia applications in the same way that Windows 3.0 with Multimedia Extensions does.

Windows 3. 1 includes the operating system functionality needed to deliver audio, animation, and image processing. Windows is familiar and easy to use, and its graphical user interface (GUI) is perfect for working with multimedia applications.

**The Multimedia PC**

To take advantage of the multimedia functionality in Windows 3. 1, you need hardware (audio board, an MPC upgrade kit, or a full system) that adheres to the Multimedia PC Specification. Hardware that meets this specification bears this MPC logo. The MPC is an affordable version of the standard desktop PC already used by millions. A Multimedia PC (the complete system) starts at about $2000 and consists of four basic components:

• A PC *(minimum* of a 386SX based machine with 2 megabytes of RAM, a 30-MB hard disk, and a VGA or VGA+ display)
• A CD-ROM drive (to give the MPC its tremendous information-retrieval capabilities)
• An audio board
• Microsoft Windows operating system version 3.1 *or* Microsoft Windows 3.0 with Multimedia Extensions
• A set of speakers or headphones for audio output (optional)

## Many Options

You will gain entry into the world of multimedia in one of three ways:

• Purchase a new MPC with multimedia hardware already installed.
• Upgrade your existing PC (386SX or higher) to give it multimedia capability—with either a Multimedia PC upgrade kit or by piecing together individual components that meet the MPC specifications (outlined later in this guide).
• Configure a new system with either the multimedia upgrade kit or individual components.

## Some Common Questions

**Will a Multimedia PC slow down my computer or interfere with my existing software?**

No. The Multimedia PC protects your software investments and will not place an additional burden on your computer in running your existing applications.

**Can I install the Multimedia PC upgrade kit myself?**

Yes. Upgrade kits are designed for easy installation. Upgrade installation requires opening your PC and inserting an audio board into one of the PC's expansion slots, as well as installing an internal or external CD-ROM drive and loading the necessary system software.

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# Online Libraries

(By Diane Jones)
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How often have you made the trek to your local library in search of a particular book, only to find the library did not carry it, or it was already checked out? It' s a frustrating experience, isn't it?

Now you can avoid that frustration altogether. Many of our local libraries have gone online with their own BBS access. By calling the library BBS, you can access the card catalog and search for materials just as if you were actually there. Not only can you find out if a library has the particular book (or anything else) you want, you can request the library reserve it for later pick up (for a typical fee of 50 cents).

### Not your average BBSs

The software program libraries use us is typically different from most BBSs. If you are asked your terminal type and you are not sure, choose VT1OO.

In this article, the word ENTER means to press the ENTER or RETURN key on your computer. A colon (:) is the typical prompt on a library BBS. The colon usually appears on the left side of your screen.

### Not your average modems

Libraries do not always get the best modems. The librarians I spoke with recommended turning off both error correction and MNP compression if you have problems connecting. Look in your modem manual for how to do this.

To a limited extent, the Reference Desk of each Library can help you with problems or questions. The Reference Desk phone numbers are shown below in a summary of some local libraries:

(Your local library may already be online!)

### Sunnyvale

The Sunnyvale Public Library's modem number is (408) 245-7827 and supports baud rates up to 2400. When you dial in, press ENTER. When the colon is displayed, you are ready to log on.

To log on, type HELLO PUBLIC.LIBRARY and press ENTER. Once you are in the system, type HE (Help) for the list of commands. You will have access to the Library ' s card catalog. To log off, type EX and press ENTER. Reference Desk voice: (408) 730-7300

### Santa Clara

The Santa Clara City Library has three telephone lines connected to modems. The numbers are: (408) 984-3271, 3272, and 3273, and support up to 2400 baud. When you connect, press ENTER until you get a colon. After this, you have access to the system, and all instructions are online. You can access the card catalog and the general periodical's list. Reference Desk voice: (408) 984-3097

### Mountain View

The Mountain View Public Library has two modem numbers that support up to 2400 baud: (415) 940-9634 and (415) 968-0486. When you connect, press ENTER until you get the colon. Type HELLO PUBLIC, USER.CLAS01 and press ENTER.

This will give you card catalog access with all instruction's online. Reference Desk voice: (415) 903-6887

### Palo Alto 14.4!

The Palo Alto Public Library has two modern (having error correction/data compression compatible) modems: (415) 322-5441 and 322-5442 support baud rates of 300 to 14.4. They also have a 2400 line at (415) 322-5453.

Once you connect, type LIBRARY (all in caps) to access the card catalog. Reference Desk voice: (415) 329-2664

### Optional Library Services

These libraries are all part of the South Bay Cooperative Library System. If you reside anywhere in Santa Clara County, you may obtain a borrower's card at any member library and use its services. You may also return materials to any local public library.

If your library does not have the particular book or magazine you are looking for, then ask the librarian about an inter-library loan. Your library will attempt to locate almost any item for you and deliver it directly to the most convenient public library. This service typically costs $2.50.

I wonder what Benjamin Franklin would think about how the public library system he created has changed and improved with advances in technology?

For the purposes of this discussion, you can classify non-Intel 486s into two groups; clones and workalikes. The difference between the two is microcode and architecture.

There are only two entities licensed to use Intel microcode inside CPUs. The first is Advanced Micro Devices (AMD), through a decade old agreement lawyered into the present. The other is IBM, who took the simpler route of buying large portions of Intel stock, then entering a licensing agreement with Intel when it was apparent to Intel the IBM would do nothing to jeopardize its investment. A significant element of the Intel-IBM agreement is that IBM is not allows to sell CPUs unless they are soldered to a motherboard. This accounts for the fact that every IBM 486SLC is sold with a motherboard attached.

The question of architecture is not quite as literal as you might expect. Many of the manufacturing methods Intel uses are patented, and the masks used to make the traces are copyrighted, so it is not a simple matter of opening up the CPU and copying the traces. There are plenty of methods available to accomplish the same thing, though, so most silicon shops will advantage of all those engineers that they are paying to peer inside this thing and have them make improvements while reverse engineering the device. This is why AMD's CPUs (to name one) usually are available in faster versions than Intel's It's easier to improve someone else's design than create your own from scratch. Notwithstanding, even AMD sees that the cannot make any progress second-guessing Intel forever, so they recently announced a "clean room" version of their 486 clone— a 486 clone designed from the ground up without using anything of Intel's. (Turns out that it is not 99 and 44/100 pure. They recently admitted that there is about 10 percent recycled Intel microcode inside. But that is another story...) In the end, the question of architectural similarity comes down to one of functionality—8 KB cache, same as Intel, Floating Point Unit (FPU), same as Intel, plugs into the same type socket as Intel, same internal registers as Intel, etc., etc. In every way possible, it is a functional equivalent; this makes it a clone.

A workalike, on the other hand, employs a lot more Artistic License, -er Flexibility, -er "Improvements," or whatever you like to call methods of difference used to avoid patent infringement. Again, it's a question of functionality. Intel has an 8 KB internal cache, ours is smaller (larger); Intel's is 32-bit internal, ours is 16-bit; Intel's has a FPU, ours does not; Intel's requires a socket on the motherboard, our doesn't; etc., etc.

Most of the workalikes appear to be simpler subsets of Intel's 80486, a nod to the complexity of Intel's design, and a nod to the marketing reality that the only way that anyone is going to compete with Intel on this thing is get way under their price.

So, the major players in this market are AMD with good clones, and (primarily) IBM and Cyrix, with workalikes of varying capability. Of course, they all use names with "486" in conjunction with various members of the alphabet, in concert with today's toniest marketing practices. If you had trouble keeping track of 386DX and 386SX, you have just discovered what the "4" in 486 is for: it is the factor increase of confusion.

Here is the part that you have been waiting for. Included is a table of most of the current 486 CPUs listed by increasing performance. The performance benchmarks are PC Magazine's, PCBench Version 8. This test suite includes about 10 percent floating point operations and 32-bit instructions, so those CPUs with non-standard architecture or without a FPU take a performance hit. These numbers arc averaged from PC Magazine's own tests and as many machines as I could shove a floppy disk into. Allowing for minor differences in machines with motherboard, cache and memory architecture differences, these numbers are pretty representative of the CPUs themselves. Larger numbers represent better performance. Your mileage may vary. (See table above)

Several generalizations can be made from the table. Note that all of IBM's CPUs are 16-bit data and 24-bit addressing. This is in line with the Real Mode of Intel's CPUs and is the way that DOS and Windows runs, so with DOS and Windows they will fare a little better than the performance index indicates. Where they will not do well is with anything that does floating pint math, like spreadsheet recalc or Autocad or CorelDRAW! or PageMaker. The 16-bit data path is the largest single reason that IBM's clock doubled CPUs run considerably slower than their Intel counterparts.

Cyrix's feeble 2 KB internal cache and lack of FPU keep its performance index well below what you might expect from its model number. This is compounded by the fact that Cyrix uses a lot of 386 architecture internally, as well as 386-similar microcode, which is less efficient than 486 microcode. As the performance index shows, do not believe what you read on the cover.

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# A New Age Guide to Holistic Modeming

*By Hank Volpe* *Buffalo IBM-PC User Group*


One engaging facet of my "love-affair" with modems has been observing how modems have evolved. The modem and I started from very humble beginnings just a simple, 300 baud modem, a rotary dial handset and a terminal. All this was easy to understand, easy to touch, and easy to use. Kind of like using a toaster oven instead of one of today s microwave food nukers. In fact, back then (believe it or not), speed dialing was considered how fast you could move your finger from one hole on the rotary phone to another. Very primitive, but simple. In fact it was more than simple because you, the modem user, resided right at the center of this extended machine built from its associated parts. In fact, you were actually part of the hardware. You and the machine were one! Your fingers did the walking, your ears listened for carrier tones, and when you heard one, you reached out and pressed a button on the modem to magically connect your terminal to the computer on the other end of the phone line. You were happy, the machine, and your terminal were happy too.

Since then things have gotten a lot more complicated. A layer of independent thinking hardware has isolated us from the machine. Comm port selections, IRQ allocations, DMA channels, intelligent Video Cards, write-delayed disk caches, and buffered Uarts are just part of the new world of modeming. Some of the brave-of-heart are working with threaded program code and event-driven application systems that are interconnected in ways that are invisible to us. Except for a friendly little icon, or a pretty window that opens up and says "Critical Error Handler Active or System Aborting or Have a Nice Day", turns into a nice Super VGA flower, wilts on the screen and promptly locks up your comm session. Frustrating, but very graphically beautiful, and polite to you too! The source of this frustration is the key.

Frustration comes from not being in control anymore. If only you could see the whole picture before you. The working parts of your computer hardware are now more interrelated than ever, and those interrelations effect the overall satisfaction you derive from modeming. Applications like Windows hide many of the system's logical interworkings from you. It s almost as if computer hardware exists in a politically correct universe. No cause or effect (at least that you can see). A universe where each device is not a millstone, a mistake or a handicap. No, quite to the contrary, it's just a system resource that is "misunderstood". Of course, the real question is if the orchestrator, the "Being" sitting in the center of the computer universe (you, oh wise one) is up to meeting the challenges that all of this system integration can present?

Well, I m afraid that it s not going to get any easier, and the days of the rotary phone are over for good. Yet at the same time, things happening in Digital Communications are beginning to take on am almost magical form. We now have pictures, detailed graphics, simulations and on-line games possible just because of the sheer increase in speed possible over a simple telephone wire. Around the corner is the promise of ISDN and truly interactive voice/data/text applications. Those days, and the computers that will operate them, will make what we are doing now look as primitive as the 300 baud modem looks today.

Maybe those new computers will set off fire-works on the screen and whistle Dixie before the pretty Super VGA flower opens up and locks up your system (Who knows for sure) However, between then and now, a lot of good modeming is possible. That is, if you spend a few minutes learning some simple methods of getting a modem to work in harmony with all of your other system hardware. Yes, it's a holistic approach, a politically correct approach, a really 90's approach to modeming! Of course, any good Engineer worth his weight in chips will tell you that knowing how the sum of the parts of your machine play together is just plain, old-fashioned tech-ability. As we all know, "old-fashioned" is something very politically incorrect to even think of in these enlightened times! So sit back, loosen up, become one with the modem and together we will find out how to deal with getting the modem to be one with you too. Remember, your modem's not dead it's just communicatively challenged!

**Step One - Become One with the Hardware**

Ok, we have had some fun above, but seriously, you can easily solve most of your computer system integration problems if you just take the time to find out what you have installed in your machine. Get to know your hardware, and in particular, the Input/Output (I/O) devices that it has at its disposal. Every computer made since the IBM-PC needs to have a video card of some sort, a parallel port (or two) for a printer, a serial port (or two) for serial devices (like modems, a serial mouse, a plotter) Each of these devices will usually have a corresponding connector coming out the back of your machine. Take a look in the back. The cable attached to your monitor will be for your video card, but from that point on, it could become a bit more difficult. Your printer most likely hooks to a parallel port, and your mouse to a serial port. However, this is not always the case. Count the connectors, specially the unused ones, because that will give you an idea of how many system resources you might have at your disposal.

This visual identification is important, but you now need to know how those devices are configured into your system. This configuration information can be stored in the CMOS memory in your computer (if you have an ISA, EISA, or MCA bus computer) or in configuration switches on the old *PC-XT's*. In any case, this configuration can be read and summarized by many different programs. Norton's System information (SYSINFO.EXE), or PC-Tools (also called SYSINFO.EXE) are two commercial programs that can do this. There are also several shareware programs that will too: CINFO20.ZiP, SYSCHK37.ZiP, and SNOOP200.ZIP will all give you a summary of your system.

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**How many expansion slots does a Multimedia PC upgrade kit require?**
A Multimedia PC upgrade kit requires one or two slots, depending on the kit manufacturer and whether you select an internal or external CD-ROM drive. A number of upgrade kits with external CD-ROM drives require two expansion slots in your computer. Some upgrade kits offer an integrated audio board and internal CD-ROM drive that occupy only one expansion slot.

**I already own a CD-ROM drive—can I use it with a Multimedia PC?**
Yes, however, CD-ROM drives come in a variety of performance levels, not all of which are sufficient for a Multimedia PC. To be fully compatible with the Multimedia PC standard, the drive must have a transfer rate of at least 150K per second and a maximum seek time of 1 second while using no more than 40 percent of the computer's CPU processing power. This information should be included in the technical specifications for your drive. If it is not, check with your drive's manufacturer. In addition, you need to be sure that you are using Microsoft MS-DOS CD-ROM Extensions (MSCDEX) version 2.2 or later and an updated device driver for your CD-ROM drive. The manufacturer of your CD-ROM drive can provide you with version 2.2 of MSCDEX and an appropriate driver.

**I already have an audio board in my computer— can I use it with my Multimedia PC?**
Yes, however, many popular audio boards, such as Sound Blaster and Ad Lib, are not Multimedia PC compatible. Multimedia PCs require both synthesized and digitized sound. Audio compliance for digitized sound is 8-bit samples at an 11-kHz input sampling rate and 8-bit samples at a 22-kHz output sampling rate. Your audio board also requires a software driver from the audio board supplier to communicate with Windows 3.1 or Windows with Multimedia Extensions. You can obtain this driver from your audio board manufacturer. The Multimedia PC also has audio mixing capabilities that enable it to output a variety of audio sources through a single output jack. Most older audio boards do not have this mixing capability but can be enhanced with external audio mixers you can purchase separately. Check with your audio board manufacturer for more information.

**How well will a pieced-together Multimedia PC work?**
It might work very well. However, to be absolutely certain your system will be 100 percent compatible with all Multimedia PC software, use PCs, components, and upgrade kits that bear the MPC logo.



**Will ordinary speakers or headphones work with my Multimedia PC?**
Yes, but you will need a power source to drive the speakers. This can be a standard stereo amplifier (with an "audio-in" jack) or self-powered speakers, which users can plug directly into the audio-card socket in the back of your Multimedia PC. Self-powered mini-- speakers, such as those used with personal stereos, are a popular alternative. Headphones, which you plug directly into the audio card socket, do not require any external power source.

**What are the differences between the Multimedia Extensions and Windows 3.1?**
From an applications standpoint, there are no differences. Any application that runs on the Multimedia Extensions should run on Windows 3.1. Microsoft integrated into Windows 3.1 the full Multimedia application program interface (API) provided in the Multimedia Extensions.
You might notice a few differences, though. Most noticeably, the Multimedia Extensions provide an online reference guide called HyperGuide. HyperGuide represents more than 30 MB of data and only CD-ROM distribution makes sense. A few end-user accessories provided in the Multimedia Extensions are not provided with Windows 3.1, including Music Box (an accessory that provides a CD-Audio player interface to use the CD-ROM drive to play CD-Audio) and some control panel applets. Windows 3.1 provides all of the basic end-user functionality provided through the Multimedia Extensions.

## Complete Multimedia Systems Suppliers

- Advanced Logic Research
- AST
- CompuAdd
- Cumulus
- Dolch
- Fujitsu
- IBM
- Leading Edge
- NCR

- Olivetti
- Packard Bell
- Philips Consumer Electronics
- Tandon
- Tandy
- TriGem
- WANG

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## Vidio Basics from Page 4

8 by 14 with 16 colors on screen simultaneously; and the Video Graphics Array (VGA), 9 by 16 with 16 colors on screen simultaneously. You will note that CGA and EGA had much more coarse character boxes than the earliest standard, the MDA. In the CGA this meant that because almost all the box was filled with the character only one line of dots could be reserved for descenders and letter spacing. This meant that the descending character bumped into an ascending character, such as a capital letter, with no separation. The consensus opinion was that for serious work where a great deal of time was spent in front of the monitor, MDA was the way to go if serious eye strain was to he avoided. EGA was an improvement, but still not equal to the character definition provided by MDA. Only when VGA was introduced in 1987 did the computer user have the option of having his cake and eating it too. VGA had more finely detailed character boxes than MDA *and* offered up to 16 colors in text mode as well. Although VGA presented character-based text more clearly than ever before, this was not its main reason for being. In the intervening years the Graphical User Interface began making its home on PCs as well as Macs.

### *PC Graphics*

Almost immediately after the introduction of the PC, users began to think up ways they could utilize graphics and color. The block graphics that could be drawn from ASCII extended characters were OK for drawing an outline around text but for other purposes they were too, well, blocky. Although at first IBM was sure that people didn't need or want color and graphics on their PCs (they didn't use them on terminals and mainframes) it was ready to provide them when it became obvious there was a demand. CGA was IBM's first answer for graphics and color. It provided a new mode of operation, called graphics mode in three choices of resolution. This graphics mode is also known as an All Points Addressable (APA) display because in place of the character boxes each individual dot can now be addressed (turned on or off) individually to draw any shape the imagination brings to mind. While it did provide graphics and in color no less, CGA did have some factors working against it. First of all as was mentioned before it's text mode was poor. Second, upgrading to color was particularly expensive if you had just purchased a monochrome monitor because not only did the video card have to be changed but a new monitor had to be purchased as well. And third, CGA would allow the display of a maximum of 4 colors on screen simultaneously — with just two color combinations (pallets) available.



Shortly after the introduction of CGA a manufacturer came up with an the right idea at the right time. Further, they made sure their hardware was supported by software. The hardware was the Hercules Graphics Card (HGC) and the software was Lotus 1-2-3. 1-2-3, more than any other software at the time, was the reason to own a computer. Just as VisiCalc was the reason to by an Apple (I and II). 1-2-3 sent many thousands of business people to computer stores for the first time. Hercules worked with Lotus to support the ability to display monochrome graphs generated directly from spreadsheet data. The advantages were better resolution lower cost; you did not need a new monitor and you did not have to put up with those fuzzy CGA characters. To this day, many low price entry level PCs with monochrome support only the Hercules standard. With the addition of HGC and an original PC monitor the PC became a graphics machine with few tradeoffs. The machine still did not display in color, but HGC was fully compatible with MDA character definition so eyestrain was kept at bay when pouring over spreadsheets and text.

### *The Numbers Game*

HGC provided an on-screen resolution of 720 by 348 with one bit assigned to each pixel. Each dot was either on or off (1 or 0) Simple arithmetic gives a total of 32K (bytes) to draw an entire screen. This is considerably more memory than the 4,000 bytes needed in character mode and don't forget there is no "attribute" for each dot. Comparing the two systems on equal terms the HGC graphics mode requires 16 times the memory to draw slightly less screen area. This 32K sounds a piddling amount by today's standards and it was relatively easily handled then too but increasing the numbers in three dimensions as you will soon see quickly strains even today's machines.

Determining how much memory is required to display a given standard (640x480 by 16 colors for instance) is a simple matter of multiplication. Multiply the number of pixels across by the number down; 640 X 480 = 307,200. Now multiply the result times the bit depth. In a 16 color system the bit depth is 4 because it takes 4 bits to provide 16 possible options (256 colors needs a bit depth of 8, etc.). Multiply 307,200 X 4 and you have the answer: 1,228,800 bits. Divide that by 8 and the answer is converted into bytes roughly 154K bytes.

The next standard. EGA (Enhanced Graphics Adapter) was introduced in 1984. It changed the resolution slightly to 640 by 350 pixels. So it might be imagined that it made similar demands on memory but now "depth" was added. Sixteen colors out of a palette of 64 were supported so 4 bits are assigned to each pixel. This comes to slightly less than 128K bytes per page. This is now 64 times the quantity of memory required for a character mapped page. EGA outstripped the finite range of addresses reserved by the 8088 for video so a bank switching scheme was used. Four banks of 64K were switched into the address range of the 8088 so that 256K of memory could be used for video.

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INTEL 486 from Page

AMD is the truest 486 clone, and its performance figures fall in line with what you would expect by reading the label. AMD has ten years practice learning from Intel, and its performance is right in line with what you would expect reading the label and comparing it with Intel's product. It's the one in the bunch where what you see is what you get.

Intel is making its own CPU replacement The Overdrive series are identical in performance to their regular CPUs, so they do not even deserve mention here, except that I thought that you might be curious...

While not exhaustive, the table here should give you an idea of what to expect from the current crop of 486 clones. If you component shop for CPUs, you will find that the prices line up with the performance in the table. Where to watch out is when you price a complete system here, the prices tend to line up with the model number, rather than performance so you may pay for something that you do not get. Intel is doing its level best to stay out in front of the market with the Pentium. It is implementing plans to increase the number of plants manufacturing Pentium from to five by the end of 1994. They hope Pentiums will be 25% of their sales in a year's time. (This would put Pentium at 15% of the total PC market, just ahead of what Motorola's 680x0 sales are right now (Apple).) It is clear that Intel's marketing strategy is the same for the new Pentium as it was when the 80486 came out—try and convince everyone that the new processor is so much better than the old one that you should not settle for the old one. Other silicon shops considering a Pentium clone face the bleak reality that by the time they can develop one Intel will be far enough along on their production cycle to beat competition to death on price. Those that have the ability are concentrating on RISC chips, but none are foolish enough to think that they can sell it if it doesn't run DOS/Windows stuff. Thus, the efforts to make IBM/ Apple/Motorola's PowerPC, DEC's Alpha, and other RISC CPUs run native Intel code.

Realize that the recent price reductions on PCs have been in large measure possible by corporate downsizing and other overhead reducing measures on the part of manufacturers. This means that it is unlikely that prices will continue to dive on the first level machines the way that they did this year. Most companies have by now factored their new efficiency into their prices (in some cases before the savings were realized), so that near term price reductions will come from the technology end, i.e. improvements in manufacturing. These reductions are historically less dramatic. In English, this means that prices on a given class of PC aren't going to go down that much in the near future. You pay your money and you take your choice now, and you are likely to feel the same about your purchase in several months as you did when you bought it. It is unlikely that you will have serious regrets in four months about what you buy today.

The time has never been better to buy a 486 class computer. The time has never been worse for the possibility of a bad decision. I hope that this will help you get the Best of Times without the Worst of Times. The prices are so good that you can get one for DOS, one for Windows, and one for OS/2. Now, which one runs UNIX best?...



**Thank you to new and renewing members**

**New Members:**

Frank Campbell
Calvin Schrotenboer

**Renewals:**

Doug Fong
Bill Goldmacker
Richard Harding
Stan Hutchings
Lou Kavanau
Maynard Kuljian
Aldora Lee
Carol Liberato
Bob Mitchell
Delbert Philpott
Glen Roberts
Rick Samish
Ron Seltzer
Paul Staley
Keith Smith
Kendric Smith
Larry Weinberg
Morris Williams

Modeming from Page 8

INFOPLUS.EXE, a shareware program (latest version is IFP1P157.ZIP). When you run these programs you will get information like the following.

| | | | |
|---|---|---|---|
| Printers: 1 | Serial ports: 2 | | |
| Device: LPT1 | Devices: COM | 1 | 2 |
| Base port: $378 | Base port: | $3F8 | |
| | $2FB | | |
| Timeout: 20 | UART: | 8250 | |
| | 8250 | | |
| Busy: yes | Timeout: | 1 | 1 |
| ACK: no | Baud rate: | 2400 | |
| | 1200 | | |
| Paper out: yes | Data bits: | 8 | 7 |
| Selected: yes | Parity: | none | |
| none | | | |
| I/O error: no | Stop bits: | 1 | 1 |
| Timed out: no | Break: | no | no |

The 'device' repofied is the name that DOS uses to control it as a file. All devices under DOS can be opened, written, and read as files. LPT1 is DOS's name for a printer. If you wanted to use your printer as a file, you could copy a text version of this article to it by typing 'COPY NEWS.TXT LPT1.'

The "base port" is the actual hardware address of the port. Every device needs a unique address that the computer can use to send and receive information. The "$" is a programmer's notation meaning that the address is displayed in Hexadecimal notation. Since computers work in powers of "2", this is quite natural. Don't worry about converting to decimal, because as long as you configure totally in Hexadecimal, you should be able to avoid any address conflicts.

It's very important for you to realize that no two computer devices can share the same ISO address. Think of it like a mailbox. If you and a neighbor share mailbox addresses, you might get his mail, she might get yours, or you might not get any. Furthermore, if two devices share the same ISO address, the computer will think that it only has one of them and not two. For example, if COM2 above had the same address as COM1, the Infoplus program and any others running would never be able to find it. As far as they are concerned, there is only one COM1. From a computer standpoint, this is a waste of a resource. From an electronic-system standpoint, this is trouble, because two I/O ports on the same address may disable either one from working properly with the computer.

One of the biggest problems with installing modems, specially internal modems, is address conflicts with existing hardware. Modems will not work properly, programs will not access them properly, and you will most likely get a splitting headache. Count the connectors in the back, then run a program like Infoplus. Make sure that the devices you found match the displayed information reported by your system. Do this before you install anything and you'll save yourself a lot of trouble!

Since we-re working with serial ports, let's look at the rest of the displayed information. The Uart is a chip that converts the computer's data into a serial form. There are various types of Uarts, with the 8250, 16450, 16550, 16550A being the ones found in 99.9% of all PC-Compatible serial ports. Why display the type? Well, the type of Uart you have can make some applications run faster or with fewer errors. The 16550A is a special type of Uart that has a 16 bit buffer contained on the chip. This buffer can hold incoming data when the computer is too busy to process it. Some programs, specially those running under Windows, can take advantage of this buffer. Knowing the type of Uart can help you a great deal when it comes to integrating multi-threaded or multi-tasking applications using high-speed modems. The other comm parameters such as baud rate, data bits and parity are called "Communication Session Parameters" and will change depending on the program you run.

**Step Two - Feel Your Interrupts**

Unlike the printer, modems need another type of control hook, called an interrupt line. Interrupt lines serve the purpose of getting the computer's attention. Here's your computer, making a perfectly beautiful Super VGA flower. How does it know the comm port needs attention It could ask constantly, but this would slow things down quite a bit. The best way is for the comm port to tell the computer when it needs attention. This type of interrupt is called a "Hardware Interrupt". A PC can handle 8 of these, a ISA, EISA, MCA machine can handle 16. Some are already in use. How do you know which one to pick for your comm ports? Let's take a look at what's in my machine using Norton's Sysinfo;

| IRQ | Address | Device | Area |
|---|---|---|---|
| 00 | D558:0971 | Timer Output 0 | BIOS |
| 01 | D558:0A77 | Keyboard | BIOS |
| 02 | F000:EF6F | [Cascade] | BIOS |
| 03 | CF86:0310 | COM2 | BIOS |
| 04 | F000:EF6F | COM1 | BIOS |
| 05 | F000:EF6F | LPT2 | BIOS |
| 06 | 03FE:00B7 | Floppy Disk | DOS System Area |
| 07 | 0070:06F4 | LPT1 | DOS System Area |
| 08 | 03FE:0052 | Realtime Clock | DOS System Area |
| 09 | F000:ECF3 | Reserved | BIOS |

This display shows static information, in other words, it's showing us what each IRQ is allocated to do without really checking. IRQ7 is not used by my printer, and IRQ5 is not used by a second printer (I don't have one). This table is merely a reference for you, guiding you as to where you should look when integrating new IRQ devices. The "address" displayed is a memory address of the program hook (TSR or ROM) that controls the device, and points to the memory area where this TSR hook resides.

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# Are you looking SCSI Lately?

**By Fred Townsend**
President of the *Silicon Valley Computer Society*

What is SCSI? SCSI is an acronym for Small Computer System Interface. Who originated SCSI? To answer that question we will have to go back to the origins of Shugart Associates.

IBM invented the floppy disk. Allen Shugart was quick to see the market for floppy disk drives outside of IBM. To fulfill his vision, Shugart surrounded himself with some of the finest minds around and called the company Shugart Associates (SA). Allen Shugart is a mechanical engineer. It's not too surprising the key people at SA tended to be mechanical engineers too. At SA, mechanical engineering projects competed with electrical projects for development funds and usually won.

Designing the electrical circuits of the floppy drive was not particularly difficult. The first designs used standard "glue" (off-the-shelf) chips. When the focus shifted from 8 inch floppies to 5 inch floppies, the electrical engineers said "Big deal". The 5 inch drive was intended to be cheaper, not better. Electrically, its circuits were inferior to the existing 8 inch drives.

The challenge of designing floppy drives was in the electro-mechanical (E/M) and read/write head designs. Here the engineers scrambled because none of the existing commodity E/M parts were really adequate. They cost too much and their quality severely limited performance.

**Hard Drives Shrink**

IBM, and several other companies had been making hard drives for over a decade. They were big washing machine drives that used hydraulics to position the heads, and sometimes the heads did not move at all, as in the "Fixed Head" machines. The capacity of the smaller versions was 10 to 20 megabytes, but it still took four persons to lift one.

Allen continued to watch IBM's technology. At that time the industry was starting to focus on Winchester hard disk technology. While nobody really agreed exactly what Winchester technology was or meant, they did agree it was the future technology for hard drives and hot stuff. Winchester technology focused on providing comparable storage capacity in a much smaller sized drive.

Allen started developing hard drives at Shugart Associates. It's difficult to say which drive model was first because of infant mortality. There was the model SA604, the 606, followed by the 612. By then, the new half height technology had taken over the floppy market. The half height idea was quickly transferred to the hard disks where the 612 model became the 712. Hard drives offered a few technical challenges to the electrical engineer, but mostly the challenges were still how to make the circuits cheaper, not better. At this time hard drives were seldom in PCs. Rather, they were system components in mainframe computing.

**SASI Emerges**

Some of the Shugart engineers reasoned if these drives were system components, they should have a system interface. So the Shugart Associates System Interface (SASI) came into being.

SASI was not immediately accepted. Some argued the SASI interface was needed, while others did not see the need in the newly emerging PC market. What value was SASI when mainframes were becoming less popular, they argued. The MFM hard drives used a sped up version of the serial floppy interface. SASI is a parallel interface! It cannot even talk to a floppy or a regular hard drive. Some rationalized it was just a project to keep the electrical engineers happy.

**What's in a Name?**

Shugart's marketing department tried to sell the SASI interface to the systems people and the mainframes. It was a hard sell. For one thing, the name was wrong. Nobody wants to advertise a competitors name. HP had a similar problem when they designed a parallel bus to control test equipment. They called it the Hewlett Packard Interface Bus (HPIB). When HP offered their bus, royalty free, there were not too many takers until the name was changed to the General Purpose Interface bus (GPIB). The old bus with the new name was sent to the ANSI committee for blessing and became the IEEE488 bus standard. After that, lots of manufacturers signed up to use the bus.

SASI was just one of Shugart's many problems. At the same time many other companies had figured out how to make floppy drives, SA's bread and butter. Profits were eroding. Layoffs started. Head hunters found SA easy pickings as they raided some of the best talent. Then Xerox stepped up and offered to buy SA. Shugart and his investors accepted.

Part of the buy out agreement stipulated Allen Shugart could not start another floppy drive company. That was fine with Allen. He wanted no part of this profit starved field. Instead, he and his mechanical engineers, headed for Scotts Valley where they started Seagate. Their initial product looked an awful lot like an old SA606. They called it the ST506.

**Origins of SCSI**

After the Xerox buy out, some of the orphaned electrical engineers at SA left with the announced intention of making SASI chips. They called their new company Adaptec. NCR had been one of the few companies that seriously investigated the SASI interface. NCR and Adaptec learned from HP's experience. Rather than propose an Adaptec or NCR bus, they encouraged formulation of an ANSI committee for small computer interfaces. The committee made several important changes to the SASI interface. First, they made sure the interface had all the necessary elements to become a multi-threaded bus. Second, they added the command set functions that allowed a device to define itself to other bus devices. This allowed temporary busmasters and devices other than disks to utilize the bus. Now a tape drive, CD-ROM, disk drive and

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## THE SHAREWARE WRITERS LAMENT

**by Larry Weinberg**

I fill a space in software's domain
Between commercial and free acclaim,
Seeking bits and bytes to better the usual,
Writing programs for your perusal.

There's much to choose from so take your pick.
Check the features, some are slick.
There's something for all, let's hear your voice;
Take it or leave it, it's your choice.

You can't go wrong, so don't be shy;
Use the program before you buy.
Test its features,try its theme
Before you send me any green.

I've tried, I've toiled, I've done my best;
Your cost is small, my fingers rest.
Success at last, my brain's at ease
Happy someone my work did please.

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## Shoot Yourself In The Foot

*from postings on The Well, with additions by*
*Nathan Wallace wallacen@cs.colostate.edu*
*Uploaded to the NOCCCBBS*

The proliferation of modern programming languages (all of which seem to have stolen countless features from each other) sometimes makes it difficult to remember what language you're currently using. This guide is offered as a public service to help programmers who find themselves lost in this dilemma.

**C:**
You shoot yourself in the foot.

**C++:**
You accidentally create a dozen instances of yourself and shoot them all in the foot. Providing emergency medical assistance is impossible since you can't tell which are the bitwise copies and which are just pointing at others and saying, "That's me, over there."

**FORTRAN:**
You shoot yourself in the toe, iteratively, until you run out of toes, then you read in the next foot and repeat. If you run out of bullets, you continue anyway because you have no exception handling ability.

**MODULA-2:**
After realizing that you can't actually accomplish anything in this language, you shoot yourself in the head instead.

**COBOL:**
USEing a COLT45
HANDGUN, AIM gun at
LEG.FOOT, THEN place
ARM.HAND.FINGER on
HAND.GUN.TRIGGER and
SQUEEZE. THENreturn
HANDGUN to HOLSTER.
CHECK whether shoelace needs to be retied.

**LISP:**
(You (shoot yourself in the) (appendage which holds (the gun with which (you shoot yourself in the (appendage which holds (the gun with which (you shoot yourself in the(appendage which holds (the gun with which (you shoot yourself in the (appendage which holds (the gun with which you... ))))))))))))

**BASIC:**
Shoot yourself in the foot with a water pistol. On big systems continue until your entire lower body is waterlogged.

**FORTH:**
Foot in yourself shoot.

**APL:**
You shoot yourself in the foot, then spend all day trying to figure out how to do it in fewer characters.

**PASCAL:**
The compiler won't let you shoot yourself in the foot.

**UNIX:**
%ls foot.c foot.h foot.o toe.c toe.o
%rm *.o rm:.o: No such file or directory
%is %

**PROLOG:**
You tell your program you want to be shot in the foot. The program figures out how to do it but the syntax doesn't allow it to explain.

**370 JCL:**
You send your foot down to the MIS department with a 4000 page document explaining how you want it to be shot. Three years later, your foot comes back deep fried with a bill for $375,000.00.

**NEURAL NETWORKS:**
You train the network in how to shoot your foot, after which it generalizes and keeps trying to locate some guy named Connor on the net...

**GENETIC ALGORITHMS:**
You create 10,000 strings describing the best way to shoot yourself in the foot. By the time the program produces the optimal solution, humans have evolved wings and the problem is moot.

## Multimedia Upgrade Kit Suppliers

- Creative Labs
- Media Vision
- Modern Media
- NEC Technologies

- PC Craft
- Samsung
- Tandy
- Turtle Beach Systems

## Multimedia PC software

Microsoft Multimedia Publishing plans to release two exciting multimedia titles in the summer of 1992: *Microsoft Bookshelf* CD-ROM reference library, 1992 Edition, and *Microsoft Cinemania* interactive movie guide. Already available from Microsoft are *Multimedia Beethoven: The Ninth Symphony* and *Microsoft Works,* Multimedia Edition. To learn more about this and other impressive Microsoft multimedia products call Microsoft Customer Sales and Service at (800) 426-9400.

A number of other companies have also released MPC titles. To learn more about these products, contact the Multimedia PC Marketing Council at the following address. Multimedia PC Marketing Council, Inc. 1703 M Street, Suite 700 Washington, DC 20036 (202) 466-3850

## Minimum Multimedia PC System Requirements

**Hardware:**

- 386SX or higher processor
  2 MB of RAM
  30-MB hard disk
- VGA or VGA+ display
- 2-button mouse
- 101-key keyboard
- CD-ROM drive:



CD-DA outputs, sustained 150K/second transfer rate without consuming more than 40 percent of CPU bandwidth in the process, and average seek time of Audio board: second or less

8-bit DAC, Linear PCM sampling, 22.05-kHz and 11.025-kHz rate, DMA/FIFO with interrupt 8-bit ADC, Linear PCM sampling, 11.025-kHz rate, and microphone level input Music synthesizer

Onboard analog audio mixing capabilities

- Serial port
- Parallel port
- MIDI I/O port
- Joystick port
- Headphones or speakers connected to your computer system

**Software:**

- Microsoft Windows operating system version 3.1 or Microsoft Windows version 3.0 with Multimedia Extensions

- MS-DOS operating system version 3.1 or later

- MS-DOS CD-ROM Extensions (MSCDEX) version 2.2 or later (supplied with your CD- ROM drive) and MSCDEX driver that implements the extended audio APIs

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10 Vidio Basics from Page

In the intervening years, the Memory Controller Gate Array (MCGA) and Super EGA were introduced before the present king of the hill the Video Graphics Array (VGA) became popular. As VGA volume increased prices dropped. CGA , EGA and MCGA disappeared from the marketplace due to the price/performance edge that VGA held. VGA offers yet more color and resolution but puts much greater demands upon the processor

In its most simple form bit mapped graphics need only one bit to describe each pixel: 1 for ON and 0 for OFF. As the number of color planes increase the quantity of information associated with each pixel also increases. Each bit added to the pixel's description doubles the possible colors. At some point this doubling provides diminishing returns. If most monitors top out at 262,144 hues (18 bits) then any description beyond that will never find its way to the viewer's eye. Graphics images can look quite realistic with only 256 colors if those colors are carefully selected. When each value in the screen memory directly indicates what color will appear on the screen the system is said to be direct mapped. All the systems we have described so far use direct mapping.

The alternative to direct mapping is the CLUT or color lookup table. In this system a palette of 262,144 hues is available but only 256 may be used at one time. One byte for each pixel allows 256 pointers that indicate which of the 262,144 in the palette will be displayed on screen. This method allowed memory to be conserved and speed retained when processor power was not yet up to the job of real color. Increases in processor power and decreases in the cost of memory will eventually eliminate the need for expedients such as the CLUT. The persistence of VGA however means that it will be with us for some time to come as we retain reverse compatibility with earlier standards. Much in the same vein as present day systems are compatible with the earliest MDA video standard.

The trend points toward direct mapping and different schemes use 16, 18 or 24 bits per pixel. Twenty-four bit or true color systems provide three bytes per pixel. This means one byte or 256 levels for each of the primary colors thus providing a palette of 16,777,216 colors. The problem here is that even at the highest resolutions only a fraction of the total colors could be on screen at any one time. Using 3 bytes per pixel displaying the minimum VGA resolution (640 by 480) one megabyte would be required to draw the screen. Resolutions of 800 x 600, and 1024 x 768 require 1.5 and 2.5 MB of memory respectively. That much information sloshing around on any bus is going to severely tax a PC's resources 486 or not. In fact it is the bus that has become the most pressing bottleneck in the system. The two most promising ways to maximize video speed are to either provide a faster bus (VLB and PCI) or not put all the information on the bus in the first place by making the video adapter card smarter.

In next month's installment on video we will compare the various options for speeding up video operations by looking at the relationship between processor bus and video card speed.

**WHAT IS THE NUMBER??**
By Sid Felix

It seems just a bit ago that 300bps was the standard modem rate. Now we expect 9600bps as the "common" rate and 14.4kbps modems are available for about $150. CompuServe is already providing 14.4kbps service.

There are some serious questions about how fast future modems will perform using the existing telephone equipment and wiring. Some speak of the "last mile"-- the copper wires into offices and homes(installed in a less than high technology era). It may be that your downloaded file will travel through miles of fiber optics cable and be switched by the latest telephone digital switch, but how will your file fare in that last mile of copper?

A recent quotation by an expert at Hayes Microcomputer, taking into account that last mile of copper wire, listed 28.8kbps as the limit of modems. There is telephone equipment in use today that can provide transfer rates as high as 1.5mbps when the connection is T-1 to T-1. However, this type of connection is not commonly available and the average user will usually have to face "the last mile" at both ends.

At present, the pragmatic solution to the question of choice of modem appears to be 14.4kbps. You will hardly ever find a 28.8kbps modem at the other end of the line and if you should find one, it may not communicate comfortably with your particular 28.8kbps modem.

The future seems clouded in a mixture of legal issues (and perhaps politics); billions of dollars in upgrading the existing "information highway" infrastructure; the repositioning of local and long distance phone companies; and new marketing directions by the cable companies.

As a bit of sheer conjecture, just consider the implications of the following scenario:

*A Cable Company provides you with the latest set-top unit. Not only does this latest black box marvel give you all the best channels, it is also your local and long distance telephone connection along with a 30mbps data connection for your PC.* (This is not technical hype. Present day cable coax is capable of transmitting at the 30mbps data rate when converted to digital rather than analog transmission.)

Feeling SCSI from page 13

printer could all exchange information without passing that information through the CPU.

Even with ANSI endorsement, Adaptec found SCSI a hard sell too. The drive manufactures were the biggest problem. Until someone made a SCSI drive, what good was a SCSI bus? The Adaptec applications engineers began designing SCSI applications to give away to anyone who would buy their chips. One of their first designs was the ACB4000 intelligent SCSI interface for dumb disk drives like the ST506. Now any manufacturer that could design a simple parallel interface, could utilize Winchester drives without knowing how the drives themselves operated. Meanwhile, the drive manufacturers realized the old ST506 transfer rate of 625K bytes per second was not going to work for larger systems. There was another problem too. While the disk controller and the disk drive could pass data back and forth, the drive could not tell the controller anything about itself.

It did little good to have an intelligent controller if it didn't have any information about the disk it controls. For instance the drive could not tell the controller its capacity or worse, where its bad tracks were located. Some drives were shipped with a printout of bad tracks while others shipped the information on floppy disks. This did little to solve the problem.

The manufacturers generally agreed the intelligence belonged in the drive itself, rather than in the controller but, the drive community split on what to do about the problem. One sector argued the existing ST506 interface could be upgraded. Another sector argued the ST506 interface should be junked and a new interface designed. A third sector argued the SCSI interface (or SCSI bus) should be used.

**Stopgap**

The upgrade advocates were first with their Enhanced Small Disk Interface (ESDI). ESDI used the same physical MFM (ST506) interface, but with different electrical and software specifications. The data rate was doubled to 1.650 megabytes per second (MBPS). Information about the drive was stored on the drive itself, but the intelligence required to run the drive remained on the drive controller. This concession made it relatively easy to interface ESDI to the existing PC BIOS.

**IDE Smart Disk**

A different group of "start over" advocates came up with the Advanced Technology (AT) or Intelligent Disk Interface (IDE). Unlike the ESDI, the IDE interface uses parallel data transfer for a 6 megabyte per second data transfer rate. The drive controller intelligence is totally embedded within the drive. The PC side interface requires simple hardware similar to a parallel printer port.

**IDE or SCSI?**

Detractors of the SCSI interface argued that the SCSI command set was not rich enough to fully control disk drives, and that all the intelligence belonged in the disk drive. They also argued IDE was a better interface because it was faster with a 6 MBPS versus SCSI's 5 MBPS transfer rate. Also, since IDE is an interface rather than a bus, it's faster without the need for bus protocols. The SCSI advocates cried foul. They argued the SCSI command set is an open set that permits adding any commands needed. Furthermore, the SCSI bus permits the coexistence of dissimilar devices that can intercommunicate at a much faster data rate (and modes) than the IDE interface. Intelligent peripherals only enhance its performance.

The argument between SCSI and IDE advocates has raged ever since, with IDE usually winning on economic issues, and SCSI wining on performance issues. Today the battle is almost finished. Low end entry systems still use the IDE interface, but their number is dwindling. Middle to high end systems (such as graphics, file servers, UNIX, Macintosh, and main frames) all use SCSI buses. The command set has been enriched to include commands for tape drives, printers, and multimedia, as well as a very rich set of commands for hard drives. Today, it's usually cheaper to use one SCSI interface rather than separate interfaces for disk and multimedia and thus the single advantage of IDE is disappearing.


Planning Meeting
Wednesday - August 3rd
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12 Modeming from Page

The next biggest problem with integrating a new serial port or internal modem into an existing machine comes from IRQ conflicts. Your machine can support up to 4 comm ports (and more with proper hardware and software). However, you have a limited amount of IRQ lines to work with. You can share a line under certain conditions. For example, Com1 and Com3 can share the same IRQ line (4), and Com2 and Com4 can share the same IRQ line (3). However, if you try to use Com1 and Com3 at the same time (modem and mouse lets say), you get into serious problems. The best way to get around this problem is to purchase a serial card or an internal modem that allows you to use any IRQ line you wish. Most "modern" (post 1989) serial cards come with that feature. Good choices for Com3 would be IRQ5 and for Com4 IRQ7.

**Step Three - Resolve Inner Conflict**

Suppose you have a serial port that does not work properly at this moment. The first logical place to look would he the base port address. Make sure it's distinct from any other. Changing the base address is accomplished simply by changing the Comm designation number. By default, Com1 uses $3F8, Com2 $2F8, Com3 $3E8 and Com4 $2E8 Check your settings. After verifying the base address is correct, check the IRQ settings. If you cannot re-configure the IRQ (older Comm cards are locked into following the base address), then make sure you never use Com1 when using Com3 or Com2 when using Com4. I have such a condition here. I use Com1 between two computer systems (Laplink), Com2 for my mouse, Com3 for my modem (since I'm not Laplinking when modeming) and Com4 for a nice, cheery decoration (no use currently).

If you have your hardware currently installed and you are not sure if you have an IRQ conflict or not, you can run Modem Doctor (MODEMD52.EXE). Modem Doctor will actually generate a self-test IRQ interrupt (compatible with 99% of Uarts) verifying which IRQ line they are using. Modem Doctor's display then looks like this:

| Ports Assigned | Base(hex)) | IRQ Special Port Usage | |
|---|---|---|---|
| Com port 1 [X] | 3fB | 4 | |
| Com port 2 [X] | 2fB | 3 | assigned to a mouse driver |
| Com port 3 [X] | 3e8 | 4 | |
| Com port 4 [X] | 2e8 | 3 | assigned to a mouse driver |
| Com port 5 [ ] | | | not found |
| Com port 6 [ ] | | | not found |
| Com port 7 [ ] | | | not found |
| Com port 8 [ ] | | | not found |

The 'X' means the port passed preliminary diagnostics. The Base port address is the same as Infoplus's information. The IRQ display shows the results of a self-generated interrupt and verifies that Com1 uses IRQ4, Com2 IRQ3, Com3 IRQ4 and Com4 IRQ3. Additionally, Modem Doctor detected that IRQ3 is being used by my system mouse drive (so I should not try to use a mouse and a modem on Com4 at the same time). Now if Modem Doctor reports that Com1 and Com2 are using the same IRQ, this most likely is due to an incorrect serial port or internal modem installation. Same with Com3 and Com4 using the IRQ. Also, if Com1 and Com2 are using the same address, Com2 won't be found. Again, if you counted your connectors in the back, this would be a tip-off to you that something is configured wrong. Another tip off would be when Modem Doctor tries to run diagnostics on your modem. Severe errors or inability to communicate to the modem microprocessor would also be tell-tale signs of an address conflict. In either case, just checking the switch or jumper settings on your serial card or internal modem will most likely clear up any problem. Here's another tip along the same line (perfect for the switch-squeamish among us). Simply remove the new internal modem or serial port. Run Infoplus, Sysinfo, Modem Doctor or whatever. If they report all is ok, especially if they report the same hardware is installed as when you had the new device in your machine, then you *KNOW* you have configured something wrong on the new modem or serial card. Check the switches with the manual, insert again, and repeat the test.

**Step Four - Breathe, Relax, Rest**

If you are having serious hardware integration problems with an internal modem or an additional serial port, try isolating you problem using some of the tips and programs listed above. You can find most of the shareware programs on your favorite BBS, shareware library, or on my BBS. Until next time, close your eyes, breathe, relax, become on with your hardware. Learn all you can about what you have installed in that pretty little, window-making box of yours.

If you have a question about Digital Communications, please drop me a line on my BBS or use the US Mail (Paper.. How Quaint!) . Write to Hank Volpe, PO Box 43214, Baltimore MD 21236, or call the Modem Doctor BBS at 410-256-3631 (baud rates 300 to 16.8kbps)

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In 50 words or less, tell PRintSCreen what is your favorite computer font, application, utility, screen saver, clipart, joke, motherboard, retailer, Q/C algorithm, statistic, writer, publication, hardware, VBasic module, etc.....

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**HP's New Wave for Windows & Surfin' the Internet**

### DISK of the MONTH FOR JULY

DOM9407 11 files from SPARC,SPACE and AOL(Mercury Center)
1 disk

| | |
|---|---|
| blackout.zip | Seek and find game |
| ddp20.zip | Drag and drag to print |
| diskfac1.zip | Copy,compare,format utility |
| ezboot20.zip | multi-reboot,9 autoexec.bat & config.sys systems |
| grped.zip | edit PM group files |
| toolqb20.zip | add toolbar for any window application |
| windu12.zip | disk usage utility for windows |
| windupe.zip | disk copy, format and compare utility |
| winload.zip | load windows at bootup |
| wnvel41.zip | envelope printing utility |

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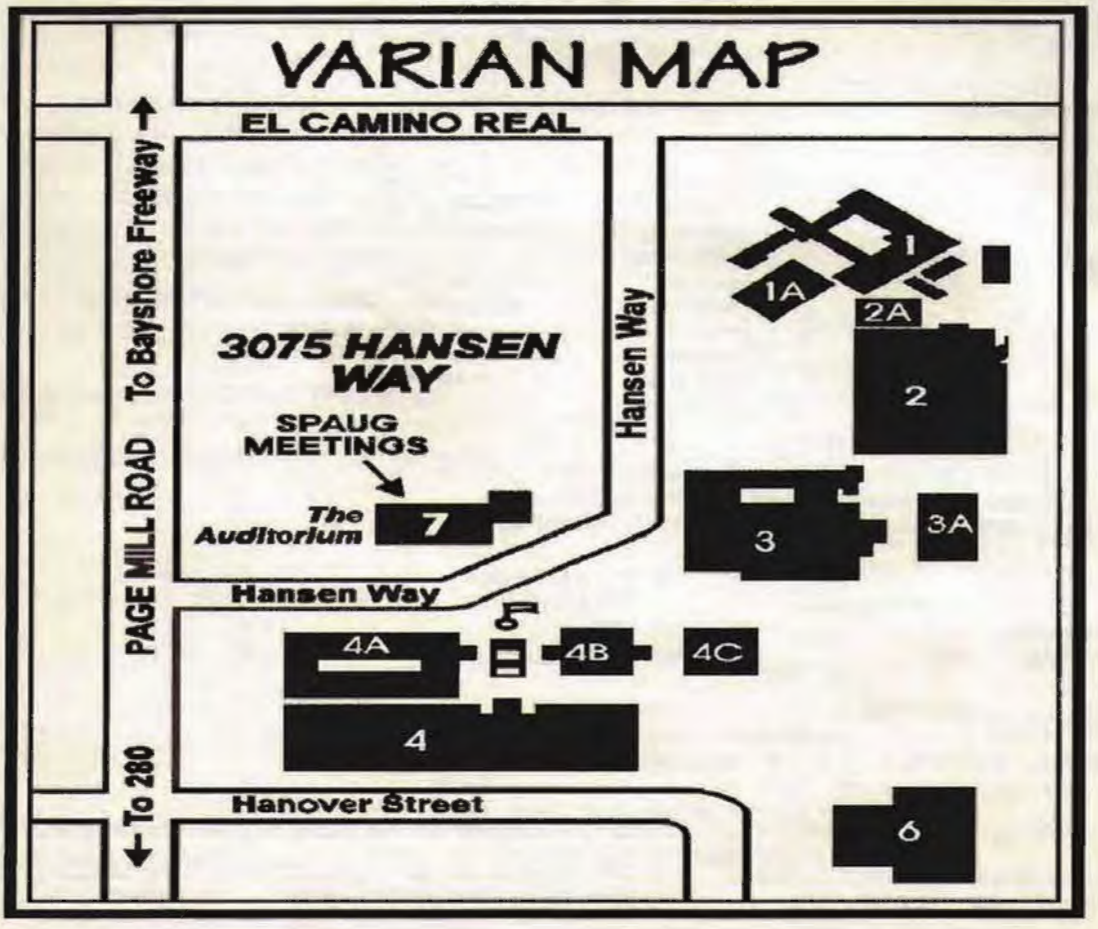
10/1/9

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