

# HARDWARE AND SOFTWARE TO ASSIST THE FAMILY LAW PRACTICE

By Reginald A. Hirsch

## I. INTRODUCTION

Technology has become so advanced in today's market that consumers are usually intimidated. This article is designed to relieve some of that intimidation. Frequently asked questions, when contemplating a new computer system, are: How much do I spend? What options do I really need? What options are available? What is the life expectancy of a new computer? The following pages will answer most, if not all, of these questions.

## II. HARDWARE

Hardware needs should always be addressed first. Without the proper hardware, software can be useless. However, this does not mean the biggest, fastest computer on the market is needed. For instance, a 600 mhz computer would be overkill for most law offices.

The good news is the scale of economy on computers is on a downward slope. In a prior article two years ago, the industry pricing for office computers with monitors was around \$2,500. The current market is about half that price. Computer reports today indicate that computer systems in the year 2000 will sell for as low as \$200.00. Due to such decline in price, the computer companies have advised that there is a potential for a shortage of 14" and 15" monitors during the year 2000.

The following is three recommendations for different priced hardware startup systems for a law office:

### A. Low End Budget System (Gets the job done but nothing fancy):

Intel Celeron 500 MHZ  
64 megs memory  
24X CD Rom  
Intel 810 chipset Video and Sound on the motherboard  
6.4 or 13.8 Gig hard drive  
Windows 98 SE (Second Addition)  
Mouse  
15"monitor  
Nic Card 10/100  
Winmodem ( its not the greatest but ok to start with)

**Cost** is less than \$1,000.00 excluding tax and shipping (Gateway E1400 without a modem sells for \$999.00; Dell's Dimension L series sells for \$1,345.00 but includes Microsoft Office 2000 software.)

### B. Mid Priced System:

Intel Pentium III 450/500 mHz  
128 Memory  
13.8 Gig hard drive(7200 rpms)  
40/50+X Cd Rom  
16/32 meg AGP Video Card  
17"inch .26mm monitor  
SoundBlaster Live with speakers  
Intel Pro or 3 Com 10/100 NIC BTW NIC= Network Interface Card  
3Com V.Everything Modem  
BX Motherboard (Asus)  
Microsoft Explorer Mouse (red-light version:)  
Windows 98 SE

**Cost** is approximately \$1999.00 for a Dell XPS. (By the way I project this will be about half price in the next 90 days and will be the system you should get before the end of the year.)

C. Maximum System:

Intel 600 mHz or AMD Altheon 650 mHz but look for Intel Coppermine at  
733Mhz year end  
128/256 memory  
17" or 19" inch monitor not more than .26 for 19 inch monitor  
18 meg hard drive SCSI Ultra 2 10,000 rpms  
Adaptec 2940U2 controller  
BX motherboard  
SoundBlaster Live with speakers  
DVD 8x Drive  
CD/R writeable drive  
G.Lite or DSL/V.90 modem  
Zip 250 Drive  
3Com 10/100 NIC  
Mouse Microsoft Explorer (this is a great mouse)cost is around \$69.00 retail.

**Cost** is approximate \$2,600.00 for a Dell or \$2,800.00 for a Gateway

Both the low end budget and mid-priced systems are sufficient for most law offices. The biggest disadvantage to the low end budget system is the limited options for expandability. What is the market saying to consumers with a \$1,000.00 computer? The low end budget computer is expendable. Two low end budget systems can be purchased for the price of one mid-priced system. The low end budget system has a life expectancy of two to three years and can be recycled or used as a backup system when it becomes outdated. The change with computers and technology is so fast paced that a two to three year game plan on equipment at \$1,000.00 a piece is all that can be expected. The mid-priced system has a two to four (maybe 5) year life span.

If your interest lies in the purchase of a maximum system, it would indicate that you want the most current technology as soon as it is offered on the market, therefore, price is not as much of a consideration. The computer market has finally recognized that the consumer does not want to spend more than \$1,000.00 for a decent system and monitor that is ready to run on a network that will be outdated by current technology in two to three years after the initial purchase.

#### D. Other Hardware

##### 1. Backup

Once your computer is up and running, the single most important hardware component should be a backup system. To backup your computer means to copy files to a second medium, which can be a disk, tape or secondary computer, such as a server, as a precautionary measure in case the first medium fails. Even the most reliable computer will eventually crash. It is recommended that you make a minimum of two backups of all your files which should be maintained in separate locations. Backup files can be made by using an operating system command, or a special-purpose backup utility. Backup programs often compress the data so that backups require fewer disks or tape storage. The backup system should create a backup of all hardware and software currently loaded on the computer. Then in the case of a total computer crash, there is a duplicate of the entire computer system.

One common mistake is to have a backup system, but the system is not scheduled and checked regularly. A backup should be made on a daily basis to include all current files of each day. This backup can be set to perform during a time period when the computer is not in use and will not disrupt the user. The backup system should be checked regularly to ensure that it is performing correctly and at the exact time that it is set to conduct the backup. For further information, see <http://webopedia.internet.com/TERM/b/backup.html>.

##### 2. Server

A server is a computer or device on a network that manages network resources. Examples can be a file server, which is a computer and storage device dedicated to storing files; a print server, which is a computer that manages one or more printers; or a network server, which is a computer that manages network traffic. Another example could be a database server, which is a computer system that processes data base queries. Most servers are dedicated to perform only the server task; however, on multiprocessing operating systems, a single computer server can execute several programs at the same time. In this case, a server could refer to the program that is managing resources rather than the entire computer. The advantage of a server is to always have a data backup. The cost of a good server continues to drop, but you do not want to be frugal on this purchase. For additional information, please see <http://webopedia.internet.com/TERM/b/server.html>

##### 3. Scanners

Scanners are instruments that read text or illustrations from a document and translate the information into a form the computer can use. Scanners work by digitizing an image. Optical scanners do not distinguish text from illustrations; meaning that you cannot directly edit text that has been scanned. To edit text from an optical scanner, you would need an optical character recognition (OCR) system to translate the image into ASCII characters. Most optical scanners sold today include an OCR package. Scanners come in different shapes and sizes, from hand-held devices you move across the paper to machines into which you feed sheets of paper. The hand-held scanners are also known as “half-page” scanners because they can only scan 2 to 5 inches at a time. Larger scanners are known as “sheet-fed” scanners, which are able to scan loose sheets of paper, but are unable to handle bound documents. A flatbed scanner is like a photocopy machine and consists of a board that you lay bound documents, such as magazines or books. Overhead scanners, which are also referred to as “copyboard scanners,” resemble overhead projects, and can be used by placing the documents face-up on a scanning bed, and a small overhead tower moves across the page. Scanners are becoming cheaper and cheaper. Often times the software, like Omnipage 9, will exceed the price of the actual scanner. It is my opinion that Hewlett Packard still manufactures the best scanner for the money, but other companies are coming close. Reasonable pricing for a good scanner should be less than \$250.00.

#### 4. Printers

Prices of printers have also dropped drastically in the last few years. Laser printers start at about \$363.00 for a Hewlett Packard 1000xi (prints 8 pages per minute) to \$1,000.00 for a Hewlett Packard 4050 (prints 17 pages per minute). The need for speed of the printing would be determined by the volume of the office. It is my experience, that for the volume of a normal law office, the faster the better.

#### 5. Modems

The term modem is derived from **modulator-demodulator**. A modem is a device or program that enables the computer to transmit data over telephone lines. To get the most out of a modem, the user should have a communication software package that simplifies the task of transferring data. Modems and the accompanying software allow users access to the internet. The latest, greatest and fastest way to the internet is by “broadband,” which is discussed further in the Internet portion of this article.

#### 6. Pricing

Pricing hardware does not have to be a tedious task. Instead of going from computer shop to computer shop trying to find the better deal, always check the Internet. There are some great sites for price comparison. Take the time to check the prices before you buy. Some recommended sites for comparison shopping of computer equipment are [www.shopper.com](http://www.shopper.com), [www.pricewatch.com](http://www.pricewatch.com) and [www.buy.com](http://www.buy.com).

### III. SOFTWARE

A computer system may have many pieces of software, but the most singularly important piece of software in a law office is the word processing package. The legal community has two basic choices for word processing packages: Microsoft Word and Corel's Word Perfect. Both software packages offer 2000 versions. It is interesting to note that when you load Word Perfect 2000, the screen says "9.0." While I will not pick a "winner," I will say that for every Word Perfect user there is a Word user who swears their program is superior.

#### A. Word Perfect

Word Perfect continues to hold its own in many law offices. Why? Because Word Perfect was the first software package offered and most lawyers/paralegals/secretaries hate change. (After all, what's a law practice without reveal codes.) The following is a list of the pros and cons for Word Perfect 2000:

##### 1. Pros:

Word Perfect 2000 offers a legal tool bar with the following options:

- Automatic line numbering for pleadings
- Document summary
- Creates a Table of Contents
- Creates a Table of Authorities
- Automatic paragraph numbering
- Automatic outlining
- Redlining
- Strikeout
- Compares two documents
- Creates watermarks
- Updates the Table of Authorities or Index

##### 1. Cons:

Word Perfect 2000 (9.0) was released early, probably to meet MS Word 2000's time line, and to hold it's share of the market. The first service patch was huge with a 46,485,075 meg file available by download or CD rom. Word Perfect 2000 does not convert MS Word documents very easily and still has issues with formatting. Neither software package, Word Perfect or MS Word, handle the problem of conversion smoothly.

Here's what the Canadian law firm of Borden & Elliot had to say about WordPerfect 2000 a/k/a WordPerfect 9:

The staff at Borden & Elliot are very pleased with the new features that are offered in WordPerfect Office 2000. "We believe this is the very best product in terms of business applications."

**Robert Russell**, Partner, Borden & Elliot

### **The Business**

Founded in 1936, Borden & Elliot is a Toronto-based law firm. It has over 675 lawyers and staff, and is one of the largest law firms in Canada.

Borden & Elliot offers a broad range of legal services to a diverse client base. Its specialized expertise includes corporate and commercial, banking and financial, litigation, communications and technical and intellectual property. It has one of the largest litigation departments in Canada, and many of its lawyers are leaders in developing expertise in new or expanding areas of law, such as health care, environmental and computer law.

### **The Challenge**

The law firm needs reliable software that works well in a legal environment. In addition to providing powerful document creation capabilities, the proposed office suite must support multiple file formats and provide a secure means for electronic filing.

### **The Solution**

Borden & Elliot is the first law firm to implement WordPerfect® Office 2000, Standard Edition in North America. The suite is designed for users who work intensively with multiple applications, such as word processing, spreadsheet, presentation, and desktop database applications. Its core applications include WordPerfect 9, Quattro® Pro 9, Corel® Presentations<sup>TM</sup> 9, and CorelCENTRAL<sup>TM</sup> 9.

### **The Benefits**

“The staff at Borden & Elliot are very pleased with the new features that are offered in WordPerfect Office 2000,” says Mr. Robert Russell, the partner responsible for technology at Borden & Elliot. “We believe this is the very best product in terms of business applications.”

WordPerfect Office 2000 delivers the features and tools necessary to create legal documentation efficiently. New and enhanced features such as increased import and export compatibility with Microsoft® Office, Publish to PDF and support for HTML, OCDB, Java<sup>TM</sup>, SGML and XML make the suite a perfect choice for the law firm.

### **Compatibility**

File compatibility is at the top of the list for Borden & Elliot when it comes to selecting an office suite. “We believe the tools in WordPerfect Office 2000 have significantly resolved compatibility issues with other word processors,” comments Mr. Russell. “The suite easily supports competitive software, which makes communicating with customers much easier.” WordPerfect 9 can convert files to and from WordPerfect in native file format without importing or exporting the documents. WordPerfect 9 also lets users open and save Lotus® and Microsoft® files in their native formats.

Corel’s definition of compatibility extends beyond file compatibility with other office solutions. The primary goal behind WordPerfect Office 2000 is to increase compatibility with open standards, de facto standards, and competing technologies. “Corel has taken a significant leap forward in creating compatibility with other formats, including XML and PDF, which will be critically important in the era of electronic filing,” Mr. Russell remarks.

Third party integration is another feature Borden & Elliot evaluated while selecting an office suite. “Corel provides a powerful set of development tools, combined with an adherence to industry standards,” says Mr. Russell. “This provides a simple yet solid platform to integrate third party applications like Docs Open.” In addition to integrating WordPerfect Office 2000 with document management software, Borden & Elliot also uses the offices suite with specialized templates created by Nereosoft for documents such as fax sheets, letterhead and legal documents.

### **Performance**

WordPerfect Office 2000 has several legal features built right into the Standard Edition. In particular the Legal Toolbar includes all the features that legal users would need on a regular basis, so that all they need to do is point and click to use them. Features such as Pleading creation, Document Summary, Table of Contents, Table of Authorities, Insert Paragraph Number, Outline, Line Numbering, Compare, Watermark and are all found on the Legal Toolbar.

The Publish to PDF feature is very beneficial because it enables law firms and their clients to reliably exchange and view electronic documents, independent of the environment in which they were created. “Corel’s introduction to PDF is a great step forward in the electronic filing world,” comments Mr. Russell. “The ability to publish to this standard enhances the software’s utility in future

electronic filing standards.”

### **In Summary**

Borden & Elliot selected WordPerfect Office 2000 for its file compatibility functionality and its ability to support third party integration. The legal firm also found value and high performance among the core applications of the suite. “We’re a great supporter of Corel products because they are focused on providing tools that work well in the legal environment,” notes Mr. Russell.

WordPerfect Legal Edition 2000 is schedule for release in November 1999.

## **B. Microsoft Word 2000**

Office 2000 is Microsoft’s latest business productivity suite offering and has replaced Office 97. The 2000 suite is now offered in several different packages called “editions.” Each edition is tailored to a different type of customer.

1. Here are some of Word 2000 touted features and flavors:
  - a. Premium Edition: Microsoft Word, Excel, PowerPoint, Access, Publisher, Outlook, Office Small Business Tools, FrontPage, PhotoDraw
  - b. Professional: Microsoft Word, Excel, PowerPoint, Access, Publisher, Outlook, Office Small Business Tools
  - c. Small Business: Microsoft Word, Excel, Publisher, Outlook, Office Small Business Tools
  - d. Standard: Microsoft Word, Excel, Outlook, PowerPoint
  - e. Copy and Paste Multiple Items: Copy up to 12 pieces of information from any Microsoft Office document, then paste them, either individually or all at once, into another document.
  - f. See Type Font Styles Before you Choose Them: Preview font styles before you choose them using the new what-you-see-is-what-you-get (WYSIWYG) pull-down Font menu in all Office 2000 programs. Now you can select the font you want, even if you don’t know it by name.
  - g. Send E-mail Directly from Your Office Programs: Click the new Office E-mail button on a toolbar in any Office 2000 program, and then e-mail your document. Your document is sent in HTML so

anyone with a Web browser can view it.

- h. Simplify Desktop Management with Install on Demand: End users can use Install on Demand to save hard disk space, installing programs and components only when they're needed. IT administrators can use Install on Demand to determine which features to deploy to different groups of users, thus improving manageability.
- i. Custom Installation Wizard Aids Flexible Deployment: The Custom Installation Wizard is the next generation of the Network Installation Wizard, and helps administrators customize applications with more precision - at the individual feature, menu, and toolbar level.
- j. Easy Exchange of Files Between Office 97 and Office 2000: All Office 2000 applications besides Microsoft Access 2000 use the same file formats as Office 97, so you will have no problems sharing files when using those applications. The new file format for Access 2000 adds Unicode support, so databases can more easily be shared worldwide, and includes file converters for exchanging files with those using previous versions of Access.
- k. HTML as Companion File Format Provides Universal Viewing of Documents: Microsoft Office 2000 users can save their documents to HTML format without any change in their original formatting, enabling anyone with a Web browser to share Office documents.
- l. OLAP Support Brings More Enterprise Data to the Desktop: Office 2000 supports SQL Server Online Analytical Processing (OLAP) Services, which allows users to carry out high-performance, sophisticated analysis on large volumes of enterprise data. In addition, a broader audience of users can access corporate information, eliminating the need for central IT departments to create standard reports for the entire organization.
- m. Self-Repairing Programs Increase Productivity and Reduce Support Costs: Office 2000 automatically detects and fixes errors without users ever knowing there was a problem, verifying and reinstalling any files and registry entries needed to run a program if necessary.
- n. Detect and Repair Helps Users Correct Files: From the Help menu, users can now select Detect and Repair to manage file problems, such as font and template errors.

- o. Customized Help and Alerts Reduce Support Calls: Companies can add customized information and links to Office 2000 Help and alerts (such as "There is no printer installed"). The links can take users directly to information on a company intranet, reducing the need for phone-in support.
- p. Roaming User Profile Eases Support for Mobile Employees: Office 2000 stores user-specific settings in a single location on the server, so users can move from computer to computer and retain the same Office profile, provided the computers run the same operating system (such as Windows NT® Workstation).
- q. Office Profile Wizard Eases Moves to New Computers: Administrators can back up and restore users' Office 2000 settings and preferences with the Office Profile Wizard when moving users to a new computer or installation.
- r. Multinational Deployments Streamlined: Multinational companies can reduce administration costs by deploying the single worldwide executable now available for each Office program. Then, using the new MultiLanguage packs that can be licensed with most Office suites, administrators can further deploy the different language interfaces and help menus to the users who need them.
- s. Support for Terminal Server Allows Standardization Across Hardware Systems: Office 2000 is a model application for Microsoft Windows NT Server Terminal Server, making it possible to deploy Office 2000 from a server back end to a variety of desktops, including computer terminals, cross-platform hardware, and legacy systems.

Microsoft's real claim to fame is its web integration, which means Microsoft produces a web ready document. As to how this feature benefits the family law office, I'll let your imagination roam.

- t. Feedback from Microsoft Product Group:

It is important to let all of our customers know that Word does count text accurately, including footnote text, when a word count is performed on a whole document.

The 7<sup>th</sup> Circuit has noted that Word can fail to make accurate counts of the

numbers of words in a brief. This can lead to unintended violations of the current version of Fed.R.App.P. 32(a)(7), which sets maximum word counts for briefs. DeSilva v. DiLeonardi, Nos. 99-1754, 99-1769, 1999 WL 517177 (7<sup>th</sup> Cir. July 21, 1999).

The issue raised by the court is specific to when a user has selected a portion of text, rather than the whole document, then runs the word count. In this situation footnote text is not counted.

Microsoft will soon be releasing a free software add-in (macro) to prevent users from unintentionally experiencing this in their use of Word.

2. Cons of Word 2K:

*PC Magazine* listed its Top 10 New Features in Office2K.

The No. 1 reason to upgrade is: an improved installer.  
(Hello? I can't even *say* "must-have installer.")

No. 2 is a "Synonym Finder" that's allegedly different from the online "Thesaurus" that was already there. (It goes downhill from there.)

(I'll tell you what *I'd* like to see: I'd like to see someone take a *chainsaw* to that paperclip with the googley eyes.)

Hiding somewhere in the O2K "benefits" was PowerPoint's new "Save in Death-to-Netscape Format." Actually, Microsoft calls this feature "Save as Web Page," but the effect is the same: The saved Web pages can *only* be viewed with Internet Explorer. (If you try to look at the saved Web page using Netscape, all you get is an error message.) If you bypass the default, you can save it in a format that's Netscape-compatible, but the result doesn't always look quite right.

The Microspeak interpretation? No, this is *not* a known issue. (That would imply it's a *bug*.) According to Chairman Bill, *this* is preserving Microsoft's "right to innovate."

No doubt about it. When I grow up I want to be forced into early retirement. So I can go out on the porch and pretend it's cool. Go on vacation and *really* relax. And maybe take a book to the shade, and succumb to the known issues.

C. CNET's Comparison of Microsoft Office 2000 and WordPerfect 2000:

**Microsoft Office 2000:**

There's nothing we like better than a David and Goliath story, especially, of course, when David wins. And there's no doubt that Corel's David, WordPerfect 2000, fights the good fight.

But let's face facts: in the battle of office suites, Microsoft's Goliath wins by a mile.

**Industry Standard**

The new features in Office 2000's core applications—Word, Excel, and Outlook—didn't exactly knock our socks off, but there's no doubting that they've essentially become industry standards. If you aren't using Word or Excel, you'd better be using an application that's compatible, or you'll be out in the cold.

**Awesome Web Integration**

The real story in Office 2000 is its application-wide use of HTML as a native file format. That means an Office 2000 user can edit any Office document on the Web from a browser, while publishing documents on the Web is a snap—a quantum leap over Office 97's weak Web publishing capabilities.

**WordPerfect: Still a Contender**

WordPerfect 2000's done an admirable job of facing reality by offering smooth compatibility with Office 2000 applications. In addition, the classic WordPerfect word processor still holds a dear place in our hearts, and Corel's Trellix rivals Office 2000's Web publishing abilities in every respect.

But at the end of the day, you don't want an office suite that's great at working with the top dog—you want the genuine article. If you're ready to upgrade office suites for the new millennium, MS Office 2000 is the suite to beat.

Finally MS Word recognizes the need to catch up in the legal community and has announced the following:

#### Microsoft Word Legal User's Guide

Microsoft has worked closely with some of the leading experts in the legal community to create the Microsoft® Word® Legal User's Guide. The Guide contains step by step instructions to help users accomplish the tasks necessary to build robust legal documents.

The Guide is broken up into a number of chapters, each covering a topic such as:

- Working with Styles
- Legal Numbering
- Working with Long Documents
- Avoiding Corrupt documents
- Sections
- Headers/Footers
- Cleaning up Problem Documents
- And Others

The Guide will be ready by the end of November 1999

#### D. Author's Comments:

It is worth noting that both software packages contain a spreadsheet program that is user friendly and versatile. The difference between MS Excel vs. Word Perfect Quattro is virtually indistinguishable. Both software packages include the spreadsheet program with the purchase of the suite.

#### E. Additional Software

##### 1. Voice to Text.

This feature is still in the design phases. There are software programs available such as "DragonSpeech" and "IBM ViaVoice," but are still not perfect. Voice to text software requires training of 1 to 2 hours, and if you have a cold or the user's voice changes, you have to retrain. The best a user can expect is 80% recognition of the user's voice and to accomplish this high percentage requires hours of work.

##### 2. Kidsmate.

Kidsmate software is a calendar program created for visitation/custody

type situations in the courtroom. Kidsmate was designed to take the time-consuming and tedious work out of making calendars for the trier of facts. The Kidmate software offers:

- Built-in dates for national and religious holidays
- Percentage of possession time can be automatically calculated
- Time split shown graphically
- Expenses allocated and tracked between parents
- Recording keeping provides a 'neutral' view of the history of the case
- Integrates the Texas Standard Possession Order
- Allows different "versions" for 'what if'

The results from using Kidmate:

- Improved Client Services (faster, better, cleaner)
- Improved court presentation
- Leveraged Attorney time
- Billing Tool for Client Use

Kidmate will be made available to any Judge (by judge or attorney request)

#### **IV. SELECTING AN INTERNET SERVICE PROVIDER (ISP)**

Selecting an ISP can be tricky and pricing is not always an indicator of service.

- A. Things to look for when selecting an internet service provider:
1. Yes, **word of mouth** can be a valuable tool in determining which ISP to choose. Ask around and make sure you check out the ISP.
  2. Yes, some ISP will give you a **trial period** and if they don't advertise one, ask for one.
  3. Do not sign up online. Talk to a **human being**, ask questions and check the availability of the technical support. You do not want hours like 1- 4 a.m. or only on the 3<sup>rd</sup> Friday of every odd year. I just got a CD offering 100 free hours, why shouldn't I use it? Check the fine print. My daughter got over charged because she didn't read that you had 30 days from initial logon to use the 100 hours, when she thought the service would be free.
  4. Many cities have **usenet groups** discussing ISPs. I'll bet you didn't know that. Houston's own usenet newsgroup is entitled *houston.internet.providers* and here are a few examples of users discussing ISPs.

On Wed, 14 Jul 1999, Eric Scalf asked:

>I hear so much support for insync, <http://www.insync.com>  
>however I must point out one thing...  
>  
> At least to me they seem expensive.  
>Quoted from Insync's Pricing Page:  
>  
> Dial Up Connections  
>(With 2 year contract)  
>  
> 56 kbps Analog Unmetered 0A Initial Setup: \$20.00 0A Monthly  
> Fee: \$24.95  
> \$24.95 seems to be one of the highest rates in Houston.  
>What does Insync offer that others don't for \$24.95?

Response from a user:

“That \$24.95 goes towards paying competent people to run the systems and paying people who know how to solve problems to answer your questions when you need support. I've seen the type of support offered by cheap dialup companies, and I can say that I wasn't impressed at all. My only money complaints about Insync are personal ones. As my mom and little brother will tell you, their service is top notch 99.9% of the time.”

So check and see if a newsgroup has a discussion of your proposed ISP. The Better Business Bureau is another good source. Always consider how long the ISP has been in business. Here today, gone tomorrow, may be their motto.

5. Determine whether you are going to need to connect in locations other than your home or office. You may need a national ISP with connection points in many cities like MSN or AOL if you do commuting and want to stay online. Otherwise you will have to call long distance to get a connection.

If you plan to **access** your e-mail from other cities, hotels, or airports, then you may consider an ISP which offers local access in most cities.

6. Pricing can be an indicator of service. Here's what one user in *houston.internet.service* had to say about ISP pricing:

“Would you walk into Ruth's Chris

Steak House, order a \$30 32oz Prime Porterhouse T-Bone and argue with the waiter over the price because Denny's charges \$5.99 for a Top Sirloin? After all, Beef is Beef, right?"

Be sure to check the costs involved with an ISP. Some ISP's have low monthly rates and high setup fees. Some ISP's that are local or regional in the service area have a 1-800 service but charge by the minute per connection. When you choose an ISP, ask about the cost of local and long-distance service.

7. How does the Houston and Dallas/Fort Worth area rate in getting on ramped to the internet?
  - a. Best
  - b. Average
  - c. Poor

If you answered "c" you are right according to tests run at <http://www.keynote.com/> Here are their comments:

"Performance experienced by users varies greatly depending on the metropolitan areas in which they are located. Our measurements indicate that users in Phoenix, Dallas-Fort Worth, Houston, Kansas City, and Miami metropolitan areas tend to experience worse response times than users in other metro areas accessing the same web servers. This correlates with the scarcity of fiber-optic cable and other infra-structure deficiencies in these areas of the United States."

But if Houston streets, with the red, white and blue sheathes and heavy cable machines plowing up the terra firma, are any example, there are miles and miles of cabling being laid and service should drastically improve in the next twelve months.

- B. What is a backbone and why is it important? The following are direct quotes found at <http://www.andreas.com/internet.html> which give a

history and explanation of the Internet in order to understand the term “backbone.”

## 1. A Brief History of the Internet

In the 40s and 50s, computers were dedicated devices. IBM tailored the mainframe computers to each corporation. Corporations had no interest or need to exchange information with each other. Ford Motor Company had a computer that could handle automobile manufacturing, cost tracking and American Airlines had a computer (SABER) that could handle airline reservations and billing. (Incidentally, SABER was an adaptation of the NORAD military computer system for tracking Soviet bombers to deliver nuclear weapons, which is similar to tracking airliners to deliver passengers. This happened because one of the IBM engineers who built the NORAD computer system was named Smith. Smith was sitting in an American Airlines plane next to another guy who was also named Smith and who was also the president of American Airlines. It was a long flight and by the time they got off the airplane, they had invented SABER. So you can see that Ford's computers were really different from airline computers.)

In 1969, the US Department of Defense's nuclear weapons researchers began linking their computers to exchange research data and other information. This first, primitive network was called ARPANET. They developed a data standard called TCP/IP (Transmission Control Protocol/Internet Protocol) so that data could be translated between different types of computers and networks over different types of transmission systems, including telephone lines, radio, laser beam, satellites, and so on.

In 1985, the National Science Foundation (NSF) created six supercomputer centers around the US. To give researchers access to these supercomputers, the NSF built the NSFNET network to link university and corporate researchers to these supercomputers. The network used a 56 kbps line: state of the art at the time. Today, a 56 kbps modem costs about \$85. The university students used NSFNET for e-mail and Usenet newsgroups.

In 1987, the NSF created the NSFNET backbone with a 1.544

mbps T-1 line. It linked 170 networks. IBM, MCI, and Merit cooperated to build a 24-hour operations center.

In 1988, the IBM, MCI, and Merit team built the first T-3 backbone.

In 1990, the IBM, MCI, and Merit team was spun off into Advanced Network and Services (ANS) which installed the first 45 mbps backbone. Within two years, some 3,500 networks were connected through the NSFNET backbone.

In 1993, Sprint, MCI and other companies were building backbones. The NSF got out of the backbone business and began building NAPs (Network Access Points) which were the connections between backbones.

In April 1995, the NSF backbone was shut down. Backbones are now built and operated by private companies, such as Sprint, MCI, and so on.

## 2. An Explanation of the Internet

The Internet is made up of networks that are linked with each other. There are approximately 3,500 major networks. Most universities, large companies, and the various departments of national and state governments have networks. Many of these networks are local (cities) or regional (such as states). There are also ISP's, such as Netcom or AOL, which are commercial networks to which anyone may subscribe for service. An ISP could be in an office tower with dozens of computer engineers and millions of dollars of equipment or could be a kid with a Windows 95 computer in the closet.

Ford Motor Company links their network sites all over the USA by using a high-capacity line that is called a backbone. Backbones are measured by their transfer capacity in Mbps (million bits per second.) A T-1 backbone line can carry 1.5 Mbps (1.5 million bits per second.) A T-3 backbone carries 45 Mbps. There are also backbones based on fiber optical cable (OC). The OC-3 carries 155 Mbps and the OC-12 carries 622 Mbps. Despite what people say about thick pipes, these are thin cables, about the thickness of

your phone line. Other backbones are based on satellite links. Satellites are cheap since they can project to an entire continent (for example, India or South America.) (Bill Gates and Craig McCaw, the boy billionaires, are building Teledesic which will use 80 satellites to offer planet wide access via cell phones at ISDN speed.)

To illustrate the backbone speeds, a home computer usually has a 33.6 kbps modem that can transmit 33,600 bits per second. A T-1 line is about 45 times faster; a T-3 is line about 1,300 times faster. To illustrate this: a 16 MB file (roughly an 8,000 page book) takes 90 minutes to transfer on a 33.6 modem, two minutes on a T-1, and four seconds on a T-3.

In September 1997, there were 31 backbones in the USA, run by MCI, Sprint, ATT, etc. This number is growing fast. Qwest is opening an OC-12 optical cable backbone in late 1998 that will have more capacity than all present backbones. It will be able to transmit the Library of Congress (twenty million books) in several minutes.

These 31 backbones interlink with each other at eleven Network Access Points (NAPs). These NAPS are the hubs of the Internet. The NAP is somewhat like a train switching station where a train arrives at Kansas City and the first ten wagons are routed towards Chicago, the next five are sent to Dallas, and the last 7 are sent to Denver. NAPs route millions of bits per second. Silicon Valley has four NAPs (one of which is named Mae West). Other NAPs are in Philadelphia (one), Chicago (two NAPs), Washington DC (two NAPs), Dallas, Houston, and Los Angeles. Many of the backbones often share the same buildings in many cities so the engineers have linked their backbones with each other slightly unofficially. Thus there are hundreds of NAPs.

Backbones have access points in large cities. The Internet Service Providers (ISPs) are smaller network services that link up to those 31 backbones. They tap into the flow of information from the backbones and distribute to yet smaller customers, such as home subscribers. ATT WorldNet, when it started in 1996, was merely access to BBN Planet's network which in turn ran on MCI's backbone. The users paid ATT for the right to use BBN Planet. Microsoft Network (MSN), Earthlink, etc., are ISPs with local banks of modems, leased T-3s and T-1s. Some ISP's are regional, others are nationwide.

It is good to have an ISP with several backbone connections. Some may connect to three or four different backbones, so if one goes down, they can continue to transmit on the others.

- C. Network Access Point (NAP). Once your data reaches a backbone, it flows at the speed of light. The data takes less than .03 seconds to travel across the USA. The data then hops across a NAP into another backbone and continues to its destination.
  
- D. Modem-to-User Ratio. Your ISP should have a high modem-to-user ratio. This means that you will get fewer busy signals. In most cases there are 10 modems per 100 users. Ask the Provider for the number of modems and users in your area (it doesn't matter that they have 100,000 modems nationwide, what matters, is how many users in your area are using the POP in your area). The "POP" is a Point of Presence, or your local access telephone number, which generally means an unoccupied office with racks of modems. POP's are generally near the telephone company's systems building or the backbone access point.
  
- E. Technical Support. Having a good backbone, etc. is just part of it. You also want technical support that actually answers e-mails. Most ISP's are widely overloaded and they can barely deal with internal problems. There is huge demand for technicians, so anyone who understands any of the aspects of this article will probably not be working in a technical support position.
  
- F. Ranking ISP's offers. You could also make a list of local ISP offers, rank them by service and price, and then see which ISP is connected to the several best backbones: CompuServe, GridNet, AGIS, UUNet, SAVVIS, Genuity, ATT WorldNet.

Boardwatch's <http://www.boardwatch.com/> bimonthly INTERNET SERVICE PROVIDERS is a 500 page catalog with technical profiles of backbones and 17,000 ISPs. This reference will enable you to find a local ISP with a fast backbone.

- G. Salespeople. Be cautious when relying on information from salespeople. In most cases they have not been trained in the technicalities of the internet or the providers which may result in wrong information.

- H. What is the difference between America Online (AOL) and Larry's ISP? Not much. Both offer a connection to the Internet. Once you've passed through their access point, you have equal access to any other computer on the net. You can create your own nationwide ISP without owning a single modem or computer. Just lease access to another ISP and then sell that access.

To illustrate the difference between Internet connections: Five children create a local LAN (Local Area Network) by linking their home computers together with cables. One of these children has an Internet account with a local ISP, so they can send e-mail to the rest of the Internet. This local ISP is actually two guys with a Pentium in a closet, a leased line, and one hundred subscribers. That local ISP connects to a city-wide ISP, which connects to a regional ISP which in turn connects to the backbone. The backbone carries the e-mail across the country and delivers it to a NAP, where it is routed to another backbone. From this backbone it goes to a regional ISP, and is delivered to a local ISP. The local ISP then delivers it to another child's computer across the street.

Here's a secret tip. An ISP has extra numbers they use for testing, favorite customers, employees, etc. You can access these numbers through trial and error. Generally an ISP will reserve an entire series, so if your access number is 937-2000 and you find that access number is busy, you can try their unlisted POP telephone numbers, such as 937-2001 or 937-2002, and so on. Generally, an ISP will reserve an entire series, so you may start at 937-2099 and work downwards. No, they do not quite tell you this. Don't spread this around too much.

## V. WHAT EXACTLY IS THE INTERNET?

The word "Internet" comes from *Inter-connected Net-works*. There is no single thing called *The Internet*. The Internet is made up of eleven hubs (NAPs), thirty-one backbones, seventeen thousand ISPs, 200,000 networks, 1.3 million domain names, and some 40 million users. The Internet is doubling every six months. It is expected to reach 150 million users by the year 2,000 and 500 million users by 2010.

The Internet is totally different from any other kind of business. The more there is, the more valuable it becomes. The more it's sold, the more there is and thus yet more can be sold. Anyone who buys it can then sell it. The more middlemen there are in the game, the cheaper it becomes to the end user. Whereas most companies are extremely happy to see 10% yearly growth, it's perfectly normal for Internet companies to grow at 100% per year. Some grow at 5,000% per year.

## VI. QUESTIONS AND ANSWERS REGARDING THE INTERNET

- A. **Who owns the Internet?** Nobody. Different companies own different networks, but the interconnection is not owned by anyone. Companies and governments choose to connect themselves to the net or not.
- B. **What is the web?** The web is just one of the transfer protocols (called HTTP, or Hypertext Transfer Protocol) on the Internet. The Internet also has other protocols such as SMTP (for email), ftp, telnet, and more.
- C. **What is an IP Number and DNS?** Each device (a computer, a printer, etc.) that is connected to the Internet has a unique identification number, which is like a telephone number. The number is called the IP number (Internet Protocol Number). For example, my web site is 209.24.47.8. In addition to this, there are also Domain Names. In the same way that telephone numbers can be 1-800-FLOWERS, the IP number can have a name associated to it, such as *andreas.com*. It is easier for people to remember the name. This means that there has to be a database of IP numbers and Domain Names. There's an organization called the Internic where one can register a domain name. The Internic maintains this database. This is the DNS (Domain Name Server).
- D. **What is a static and dynamic IP Address?** There are static and dynamic IP addresses. A static IP address doesn't change. My machine's IP number is 209.24.47.8 and it's always there, so it's a static address. When you start up your computer and connect to the web, your ISP or university has a pool of IP numbers. It assigns the next available number to you temporarily. During your connection, your machine has that IP address, so during your session, your machine is part of the Internet. When you disconnect, that number is released and it goes back into the pool for the next user. Therefore, you have a dynamic IP address.

To illustrate: When you want to see a picture of my cat, you click [www.andreas.com/willy](http://www.andreas.com/willy) and your browser sends an email to the DNS which looks up andreas.com. The DNS sees that andreas.com is a machine with the IP address 209.24.47.8. Your email is sent to my machine where a program called a daemon looks up the image file. My daemon looks at your email request, which contains your machine's dynamic IP address, so it sends the image off into the net, addressed to your dynamic IP address. Your browser receives the image and renders it onto your screen. Willy shows up.

- E. **Who controls the Internet?** Nobody. The only agreement is that everyone shall use a set of standards for data compatibility called Internet Protocol (IP). Anyone can put anything on their server: data, pictures, or programs, and it's up to others whether they use it or not.
  
- F. **Can the Internet be censored?** Via the Internet, you can reach any computer anywhere. It is just as easy to connect to a computer in Singapore or next door. A local government can forbid something, but the local users can place their web sites on computers in other countries where it is permitted and other local users can visit those web sites. There's nothing that the local government can do.
  
- G. **Does the domain name indicate the location of the computer?** Just because a domain name may be catfood.uk, it doesn't mean that the computer is actually in the UK. Again, that's just a domain name and the IP number can be anywhere. Your ISP should have a connection to one of the backbones which rates well in the Keynote test: (first is best) Compuserve, GridNet, AGIS, UUNet, SAVVIS, Genuity, ATT WorldNet (in that order). All of these are much better than average.

## **VII. SERVICES OFFERED BY INTERNET SERVICE PROVIDERS**

- A. What are some of the services offered from an ISP?
  1. ISP email account (sometimes more than one account is possible)
  2. Web storage space
  3. Unlimited dial-in access
  4. National and/or global access
  5. Preferred customer service/technical support

- B. Where to look for ISP's services

The best place to search for an ISP list is naturally <http://www.thelist.com> or <http://www.z-scapes.com> has one for 713 area codes.

## **VIII. FREE ISP's**

Yes, if you can stand advertisements running across your screen, there are FREE ISPs depending on your area code. Try <http://www.netzero.com> and the new Compaq site for dialup at <http://www.microav.com> from AltaVista. The following is a discussion by William G. Schmidt of netzero:

### Is It Worth The Price?

#### NetZero - Free Internet Access

No service fee, no sign-up fee, no long-distance fee as most areas, like Dayton, have at least one, local access number. Some, like Cincinnati and Columbus, have more than one.

It appears to be the deal of the century, totally free Internet access, full Internet service, including e-mail. There is no service fee, no sign-up fee, no long-distance fee as most areas, like Dayton, have at least one, local access number. Some, like Cincinnati and Columbus, have more than one.

It seems that what NetZero ([www.netzero.com](http://www.netzero.com)) offers is quite amazing, not only free e-mail but all Internet functions; chat, phone, video conferencing, etc. Even the software is free but therein lies the catch. NetZero is free because to use it, you must use their software. In using their software, you will be targeted by advertisers who are paying ... to reach you. It's kind of like watching network television, you get to watch the programs for free but you also have to sit through the commercials.

#### Commercials By Any Other Name

At least you can channel surf through the television commercials or, if you wish to tolerate them, you can and know that they will be over soon. Not so with NetZero, commercials are there 100% of the time. Technically this ongoing commercial-in-a-box is called the "Advantage Window" and it sits atop your browser every second you're on line. It is described as a, "movable, 1-inch by 3-inch portion of an 800x600 display that continuously delivers high-quality, 30-second ads." Yes, you can move

it anywhere on your screen, but you cannot close it.

You also have to "prove" you're there, actively logged on and using Netzero, or you'll get dumped. Let the ad window sit idle for too long, say 30 minutes or more, and NetZero will give you an "inactivity window" and drop you off line. What's the big idea? Well, when you understand what drives NetZero, you will see that it is a relatively simple one. Those who advertise want a live audience.

When you're gone, you're not.

Where Does Privacy Protection Stop?

Truly a simple concept and one that starts when you apply for a NetZero account. To apply you are required to complete a Customer Profile, to give some information about yourself. There's not a lot of information initially requested, only what NetZero calls "rough personal data." The profile information is, according to NetZero, totally confidential.

Perhaps so but, since NetZero is entirely advertiser supported, it is obvious that the supporting advertisers want to deliver advertisements to you that they think will interest you. Obviously they cannot do this without data from some source, yet NetZero insists that no advertiser will ever know who you are.

NetZero seems to take this privacy issue seriously and states that they have applied for a license with TRUSTe. They also state that they will ensure privacy and confidentiality in information they have about you. That is reassuring but, unlike other ISP's, it has been reported that NetZero will track the sites you visit to collect and compile even more, unsubmitted information on you and your interests. Among the obvious questions this brings to mind is the one that asks if this information that has been gathered on you falls under the same privacy protection claims as that which has been submitted by you.

Of course, this may be OK with you because, after all, it's free. The software that they provide is free, available for download on the net or, if you can't download it, to order by calling their toll-free number, 877-638-3117 to get the CD and pay only \$6.95 for shipping and handling. A credit card is required.

Since it works with the browser of your choice you are not required to purchase one from them. The only mention of price on their site is what you will pay in shipping and handling, so it is, essentially, free. That's something these days, and, when you add in that most areas have local access numbers meaning no long distance charges, you probably won't be able to tell it from another ISP. Except for the ads, that is.

A Fair Trade For Free? You Decide.

These ads and how they're displayed are also what seem to be generating the most complaints about the service. The ad window size and that you must click on it occasionally to remain active on the service seem to be two of the most common complaints. Of course there are the usual busy signals, no connections, slow download, complaints common to all ISP's.

However, no one wants his or her ISP to just disappear so there is one, very important question to ask, free or not, can a free ISP survive? Since its start in October 1998 as yet another innovation from Bill Gross's "idealab", it has been marketed as a very good idea. "Listeners and viewers don't pay for radio or network TV," said the initial press release, "and there's absolutely no reason to pay for Internet access." Nice concept but the fact is we do pay, if we don't want commercials, we get cable. One report states that the new NetZero dialer forces users to connect first to their own shopping site which has fueled speculation that the service, itself, is not making enough money from ad revenue alone. It would be nice to know that, if you set yourself up on this free ISP today, it will not go away next week.

It is a tough question to answer. Is free worth the possible hassle? You may be able to answer today but, ultimately, only time will tell.

For more information, please see NetZero at [www.netzero.com](http://www.netzero.com).

## **IX. HOW DO I GET A GREAT INTERNET CONNECTION?**

The main question is: “How do I get a great Internet connection?”

Not all backbones are equal. The backbones use different types of lines, different equipment, different types of customers (corporate, government, home, etc.). The technical staff's ability is important; if they are good engineers, they can improve the system. Some backbones may have old equipment but few customers and thus they'll be faster than others with state-of-the-art tools but too many big customers.

A company named “Keynote,” which can be found at <http://www.keynote.com>, did a month-long test of several million downloads across each backbone. Keynote found that the fastest backbone is Compuserve at 1.5 seconds. IBM takes 17 seconds. Bell Canada takes 27 seconds. Compuserve is the fastest because the ratio of capacity to users is higher. IBM is slower because their customers are large corporations with massive data traffic. Bell Canada is apparently using carrier pigeons (TCP = Transmission Carrier Pigeons).

## **X. CONFIGURING CONNECTIONS**

The subject of configuring connections is entirely too lengthy to be included in this article. However, Texas A&M has provided the best word description of setting up a dialup connection under Windows 95/98 for setup as follows:

A. Requirements. Please check the following requirements:

1. You must know the Communications port that your modem is connected to (e.g. COM1, COM2, etc.);
2. You will need to know your e-mail return and pop account address (e.g. [hodges@boisdarc.tamu-commerce.edu](mailto:hodges@boisdarc.tamu-commerce.edu)); For students the e-mail return address and pop account are the same boisdarc address.
3. You will need to have at least a 14.4 kbps modem. In addition, TAMU-Commerce supports K56 modems (V.90 in early summer). "x2" modems will work with our system, but connect speeds will be limited 33,600bps or less.

4. You will need your Windows 95 CD.

B. Installation Procedures for Windows 95 Internet Tools

1. Press Start, then move up to Run. Put Internet Tools disk number 1 in the A: drive and on the command line, type a:\setup.exe and press Enter.
2. The first screen will ask for the Internet Tools Path. Press Continue.
3. The next screen will request your name and title for your e-mail sender. Type in your information and press Continue. (e.g. David Hodges)
4. The next two windows will ask for your pop and return e-mail address. Type in your e-mail information and press Continue. (For students this should be the same. e.g. hodges@boisdarc.tamu-commerce.edu)
5. The next screen will ask for the operating system you will be using. Select the operating system you are using and then press Continue.
6. The last screen is the Parameter Verification screen. Carefully look this screen over and verify that all the information is correct. Once you have reviewed this information and feel it is correct, press Continue.

C. Installation Procedures for Windows 95 Dial-Up Networking

1. Press Start, then settings. Go to Control Panel.
2. Double click on Add/Remove Programs. Then go to Windows Setup.

3. Highlight Communications and press Details. If Dial-Up networking is not checked, check it now.
4. Then click OK, then Apply (if applicable). You must reset the computer for the Dial-Up Networking to take effect. After you restart your computer go to My Computer, then Dial-Up Networking. Click on Make a new connection. The name of the computer you are dialing is tamu-commerce, the phone number is 886-8092 or 450-1281 (Greenville or Metroplex number). (If you live on campus put a 9 in front of the number). .
5. You should now go back in the control panel. Double click on Network.
6. Select Add, then Protocol, and then press Add.
7. Now select Microsoft and TCP/IP. Then select OK.
8. The computer should now be back at the configuration tab. The only things needed in this section are The Client for Microsoft Networks, Dial-up Adapter, TCP/IP. Other protocols, adapters or clients should be removed. If you do not have Client for Microsoft Networks or Dial-Up Adapter go to the next two instructions. If you already have them go to instruction #11.
9. To get The Client for Microsoft Networks under the configuration tab press Add, then Client, then Microsoft, and then select The Client for Microsoft Networks.
10. To install the Dial-Up Adapter under the configuration tab press Add, then Adapter, then select Microsoft, and then choose Dial-Up Adapter.
11. At this point check to see if the only things that show up under the configuration tab are The client for Microsoft Networks, Dial-Up Adapter, and TCP/IP. If there are more drivers in there you should remove them.

12. Now select TCP/IP in the list of configuration and then click on Properties.
  13. Select the DNS Configuration tab at the top of the TCP/IP Properties box.
  14. You must click on Enable DNS. In the Host box type in your TACACS logon name. In the Domain box you must put: tamu-commerce.edu
  15. Click on OK all the way back to the Control Panel.
  16. Now restart your computer and have fun.
- D. Under Windows 98 using the Internet Wizard makes things a little easier, you'll need to know the following BEFORE you begin.
1. What you need to know for dialup.
    - a. The number and area code of your ISP.
    - b. Whether you are using a lan or dialup modem.
    - c. Primary and Secondary DNS address and WINS address if used by your ISP.
    - d. IP address if used by your system or ISP.
    - e. TCPIP installed for your dialup adapter.
    - d. If you are on a lan you or your system administrator can help or it may already be configured.
  2. Fortunately many ISP's have help to install all of the foregoing and either help files; or web pages to assist with installation. Unfortunately this is the most complex area and once you have it installed and walk through it a couple of times- it isn't too bad.
  3. Someone may have to help you the first time and don't be afraid to ask. This is what service from an ISP is about and why it is so

important - and yes it usually can be done over the phone. That's why we suggest checking out technical support before signing up with an ISP.

## **XI. HIGH SPEED ACCESS**

High speed access does not mean you can use a modem. Today's modems can achieve speeds in excess of 5000 cps (characters per second). Unfortunately, the net is crowded and complex with lots of traffic, bandwidth issues and lots of graphic web pages that use incredible resources and speed. New modems conform to the alleged V90 standard, which is a blend of two competing standards X2 and K56 flex. Although 56k is not available under certain line conditions, reasonable speeds are available. We believe this to be the maximum speeds available with analog (typical) phone service as we know it. We call this POTS, which stands for "plain old telephone service." I recommend the use of an analog modem, the 3Com Courier V Everything, and stay away from the Winmodem, which uses software and not hardware to work, and the 3Com Sportster as these are low end products. Truly, you pay for what you get.

Basically the choices for High Speed Access are ISDN, ADSL, Cable and Satellite.

### **A. ISDN**

Southwestern Bell Communication (SBC) can provide an ISDN line for approximately \$70.00 per month, including taxes and requires that SBC install a new telephone line. The good news is that for the money you get from 56k to 112k and an additional phone line that can be used while you are on the net. The cost of an ISDN modem starts at \$250.00. An excellent ISDN modem is 3Com. 3Com makes a fine product for connecting one or more machines called "OfficeConnect." For more information on 3Com, see <http://www.3com.com>. The 3Com ISDN modem cost is less than \$350.00. Your ISP may charge more for ISDN usage so check around for good pricing. In Houston, Hal-PC.ORG charges a \$30.00 membership fee and a small setup fee of \$10.00 a month.

### **B. ADSL**

ADSL stands for Asymmetric Digital Service Line and in Houston we have a rollout total cost of \$39.95 a month. This service runs over a standard phone line but requires a phone splitter so that you can use the existing

phone line to carry both voice and computer data. ADSL has a rating of 1.5 megabit download and 384K upload speeds, but only 384 up and down are guaranteed. In order to compare the availability of ADSL, please see <http://www.dslreports.com>. The computer must be within a distance of less than 2.5 miles from the central office. If there are other issues, like other ISDN lines or T1's on your bundle, the ADSL may not be accessible. Under current technology, my preference is an ADSL when taking into account factors such as cost and speed. Again, ISP's may charge more, but SBC charges as an ADSL ISP only \$10.00 a month for 1 user and 1 static IP address. Most of the cities' ISPs have followed suit. Be sure to check it out first. The good news about ADSL is that it is not a shared connection and is direct unlike cable as described below. You must have a network card for both ADSL and Cable. SBC or Warner for a cost will provide a network card and setup your MAC or Windows based machine.

### C. Cable

Warner Cable is beginning to provide a cable service which is called "Road Runner." The costs for the "Road Runner" service is about the same as ADSL. More information regarding cable service can be found at <http://www.twchouston.com> and <http://www.rr.com>

As far as speed RoadRunner says a 30 second video clip will take 16 seconds with RoadRunner and over 2 minutes with ISDN and over 33 minutes with a 28.8 modem. Ok, but how fast can she really fly?

There is no single answer to that question as answers vary depending on who you ask. The Motorola cable modem, that TW uses, can receive data at up to 10Mbps, and send data at 768kbps.

#### TRANSFER RATE FOR A 10 MBYTE FILE

<u>Modem Speed/Type</u>	<u>Transfer Time</u>
9.6 kb/s telephone modem	2.3 hours
14.4 kb/s telephone modem	1.5 hours
28.8 kb/s telephone modem	46 minutes
56 kb/s telephone modem	24 minutes
128 kb/s ISDN modem	10 minutes

1.54 MB/s T-1 connection	52 seconds
4 MB/s cable modem	20 seconds
10 MB/s cable modem	8 seconds

Source: Cablelabs (Sandy)

These results would place the 4Mb/s Cable modem 138 times faster than a 28.8kb/s modem, and 72 times faster than 56kb/s modem. The 10Mb/s Cable modem, respectively, would be 345 times faster than 28.8, and 180 times faster than 56.6...

1. According to Motorola (the manufacturer of CyberSURFER®®, the modem used by Time Warner's Road Runner):

" The data from a subscriber PC is transmitted upstream on a 768 kbps shared packet data channel which uses 600 kHz of bandwidth. Downstream the subscriber shares a 30 Mbps channel which uses 6 MHz of bandwidth and provides a maximum of 10 Mbps throughput to each subscriber. Throughput varies depending on internet access, channel load, PC processor and configuration, and headend equipment load. The CyberSURFR™ Cable Modem operates in the upstream spectrum of 6 MHz - 42 MHz and downstream between 65 MHz - 750 MHz. "

Motorola has a second generation Cable Modem out, the CyberSURFR®® WAVE with 10Mbps/1.536Mbps download/upload throughput (data upstream is transmitted at 768kbps using DQPSK modulation or 1.5Mbps using 16-ary QAM ), more front panel LEDs for diagnostic monitoring and other enhancements.

2. According to Time Warner:

Road Runner can transmit data up to 100 times faster than the fastest phone line. Under ideal conditions, this is how long it takes to download a 2MB file:

Cable Modem:	11 seconds
ISDN:	2.1 minutes
28.8 modem:	9.3 minutes

Applying basic limited math skills, 9.3 minutes = 558 seconds, which results in 100 times faster than the speed that is claimed by Time Warner which would be 5.58 second. ( Don't get me wrong, I like my Cable modem 100 times better than my old 28.8, but it is simply annoying, if not unacceptable, to get such misleading information from any ISP ). With these figures, Time Warner's Cable modem service would be about 51 times faster than a 28.8 modem. One could say, with more truth to it, that Time Warner's "100 times faster" statement is 51% true, and 49% inaccurate. Anyway, look at it on the bright side, 51 times faster means a 5,100% faster, or the equivalent of 51 28.8 modems.

3. According to the Author's Humble Experience:

My downstream average is between 40 and 80 Kbytes/second to external sites when downloading large files. The highest I have seen was downloading from the Road Runner server, of course. My highest transfer rate has jumped up to 659 Kbytes/sec, in part due to a speed patch I installed, some registry tweaks, and last, but not least, TW's improvements on the network. They changed the backbone from MCI to Digex, which has increased the speed and reduced the lag considerably.

Translated this means about 3 megabits a minute. There is a \$99 setup cost (they come to you) or for 1/2 price you can self install. There are lots of issues with cable modems and the rollout in Houston as of August/September 1999 is still in beta. The download speeds are better than regular ADSL, but it is a shared connection, which raises 2 issues. One, if someone is in front of you they will reduce your speed if both computers are downloading at the same time. So, if first in line great, if last, you

will not see great speed. Second, the shared connection. There have been security issues reported in California and other places where neighbors have actually been able to see their neighbors computers. Keep watching for this development. This information is provided at a great site for ADSL and cable at <http://www.speedguide.net>.

#### D. Satellite

Satellite is another way to go for high speed access. Unfortunately, it is one way. Information can only be downloaded from the satellite. A telephone line is necessary for the downloaded data to be further forwarded. Speeds vary from 384kps to 3.2Mega bps and up. The costs for satellite access is around \$40.00 for 25 hours a month to over \$200.00 for more usage time.

Here is what DirecTV has to say at it's site <http://www.directv.com> as of August,1999:

Hughes and America Online will market the DIRECTV/AOL TV package to America Online's more than 16 million AOL and CompuServe members in the United States, as well as to millions more consumers of its Internet brands. Hughes also will market AOL TV to its more than 7 million current DIRECTV subscribers, and to millions of potential new subscribers through its extensive network of retail outlets.

The Companies will also make the AOL-Plus broadband service available nationwide via the DirecPC satellite Internet network by early 2000. This initiative builds on America Online's recently announced partnerships with Bell Atlantic and SBC Communications to deliver DSL broadband connectivity to AOL members. The DirecPC network provides broadband download speeds up to 14 times faster than the standard 28.8 kilobits-per-second analog modem. AOL-Plus members will be able to transmit information back over standard

telephone lines at speeds as fast as 56.6 kbps.”

The following is a report from a satellite user:

What made you choose satellite internet service?

I had a software business I was running out of my basement and needed higher bandwidth than a modem or ISDN could deliver.

What was required? What equipment did you require?

A card in a PC running windows 95 (I wanted NT but they didn't have it) and the dish.

Were you happy? What did you think of the service while you used it? Best thing? Worst thing?

Overall I was not happy with the service as I did eventually shut it down. I had the service in use for a year and found it too unreliable and too difficult to debug and fix. For instance, the satellite Galaxy IV had a malfunction at one point and it was replaced with the Galaxy III. This meant I had to go up on my roof and re-aim the dish at the new satellite. Aiming the dish was very inconvenient as there was no feedback directly on the dish to zero in on the satellite. In addition the system depended on the reliability of the phone line up-link which was not very reliable either. The tech support was not great. For instance at one point I was asked to read off all of the files in a directory which was part of the standard installation. When I asked why I had to do this the answer was basically "to jog my memory."

The best thing about the service was that it was 400kbs of bandwidth.

Cost?

What made you stop using it?

This is a combination of the reliability issue I described above and the cost which was ~\$150/month (\$130 for the satellite and \$20 for the local ISP). People in Arlington are paying \$40 a month for 24x7 service with twice the bandwidth in the down direction and 10 times the Bandwidth in the up direction from MediaOne cable.

Look at anyone else?

At the time there was only DirectPC. TV, etc?

Conclusion. What advice would you give someone who is considering this service?

This is not a very good solution in the end. It's very tricky to get up and running and to maintain. It's fairly expensive and other technologies such as xDSL and cellular are starting to be used that provide much better product for the money.

## **XII. FIREWALLS**

“A firewall system is designed to prevent unauthorized access to or from a private net work. Firewalls can be implemented in both hardware and software, or a combination of both. Firewalls are under to prevent unauthorized Internet users from accessing proviate networks which are connected to the Internet, especially intranets. All messages entering or leaving the intranet pass through the firewall, which examines each message and blocks those that do not meet the specified security criteria. A firewall is considered a first line of defense in protecting private information.” If you use broadband in the law office you must initiate some form of a firewall. It can be as simple as turning off file and print sharing for TCPIP, and using NetbEUI for file and print sharing. One way to check your system’s vunerability is to go to <http://www.grc.com> and rune a program called ShieldsUps. My favorite firewall software is BlackIce for \$39.95 at <http://www.networkice.com> which is easy to configure and offers decent protection. For additional information see <http://webopedia.internet.com>.

## **XII. CONCLUSION**

Hopefully this article has not frightened you into cyberspace, where you may never return without a computer or an internet service provider. Now that you have a

better understanding of the computer system and the opportunities it affords, go enjoy modern technology at it's best. Good luck.