

# **REAL ESTATE APPRAISAL TECHNOLOGY**



**The Personal Computer technology primer for the small office  
appraiser.**

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*September 2006*

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# Technology

## *Preface*

The appraisal process –that of information collection and analysis leading to an option of value – is relatively stable; however, access methods and tools for analysis and presentation have been advancing at a breakneck pace. The appraiser must be prepared to adapt and to change his tools and methods as technology advances.

For example, digital cameras have replaced yesterday’s film cameras, prompting vendors of appraisal software to incorporate digital imaging technology into their products. This has shortened the time required for an appraiser to produce a report, and provides an inexpensive solution for photographic documentation to support a value option.

To be successful, an appraiser must continually evaluate and adopt technological advancements to maximize productivity, increase financial gain, and improve the work product.

## ***Personal Computers***

Personal Computer (PC) selection is probably the first investment decision a new appraiser will make. The savvy appraiser should research a computer purchase in the same way as an appraisal assignment, leading him to the best product for his money.



In approaching the PC purchase, you must make two key decisions: how much you can afford to spend, and the type of computer that will best serve your needs -- a portable or a desktop. Desktop PCs are more affordable, offer better reliability, and are easier to upgrade with new features and improvements. A portable notebook allows you to take your office with you into the field. Many appraisers will eventually obtain both types.

As a knowledgeable buyer, you can quickly determine if you are getting value for a potential PC investment by comparing features and prices available in sales promotions. These ads will emphasize the prominent PC features popular in the market place. The following discusses important PC components for comparison when shopping.

## **Computer Units of Measure**

This section is presented to aid in understanding technological units of measure discussed in this chapter. These measurement terms may look a bit exotic at first glance, but they are helpful in understanding and comparing products and services as our discussion progresses.

### **Metric System Prefixes**

The following prefixes are commonly seen in technological units of measure:

<b>Unit of measure</b>	<b>Standard Term</b>	<b>Abbreviation</b>	<b>Metric</b>
1,000	1 Thousand	K	Kilo
1,000,000	1 Million	M	Mega
1,000,000,000	1 Billion	G	Giga
1,000,000,000,000	1 Trillion	T	Tera

These prefixes are often abbreviated when written with a number:

- 5M = 5Mega or 5 million
- 2G = 2Giga or 2 billion

## **Computer Processing Speed**

Computer processing speed is measured in a unit called *Hertz*, usually abbreviated as Hz. It is the measure of instructions per second that a computer can perform. A computer with a processor rated at 1 GigaHertz (1GHz) can process one million instructions per second. A 2Ghz processor will be twice as fast.

## **Information Storage**

Information stored in a computer is measured in *bits* and *bytes*.

- A *bit* is a single binary unit of information and is represented in terminology by a lower-case 'b.'
- A *byte* is composed of 8 bits and is represented in terminology by an upper-case 'B'. A byte contains one character of information, such as a letter or number.

Computer memory and disk storage capacities are measure in bytes. For example:

- 512MB of memory means 512 MegaBytes, or 512 million characters of information storage.

- 100GB of disk space translates to 100 GigaBytes, or one hundred billion characters of information.

## **Information Transfer Speeds**

Information transfer speed refers to the rate at which information can be moved from one source to another, usually over the internet to your personal computer. Information transfer speeds are measured in *bits per second* and are expressed as follows:

- 56Kbs – 56 Kilobits per second, or 56 thousand bits per second
- 384Mbs – 384Megabits per second, or 384 million bits per second

Occasionally the time measurement (seconds) is preceded by a slash “/” or the letter “p”, changing the representation to notations such as 56Kbps or 384Mb/sec.

## **Computer Components**

### **Central Processor Unit**

The *central processor unit (CPU)* is the brain of the computer, and its most significant characteristic is its processing speed. CPU speed is measured in gigahertz (GHz) and indicates the rate at which the CPU can accomplish work. A faster CPU will cost more, but can return the investment in increased productivity.

The CPU found in a desktop PC will be different from that in a portable because of cooling requirements and power consumption. Faster CPUs require more power and generate more heat. Because of its larger physical size, a desktop PC can contain a sizeable fan for cooling, and therefore can support a higher-speed CPU. A portable PC is a compromise between CPU speed and portability; higher-speed portables must be larger and heavier to provide adequate cooling, so be aware of these issues when shopping for a portable PC.

Recommended CPU speeds for appraisal use are 3GHz for a desktop, and a minimum of 2GHz for a portable.

Intel and AMD are the leading CPU manufacturers, producing CPUs with technological-sounding names such as “Duo Core”, “Athlon”, and “centrino”. Both companies produce good products. When comparing PC prices, you should compare Intel to Intel and AMD to AMD.

### **PC Memory**

PC *memory*, sometimes referred to as random access memory (RAM), is temporary storage for information, as opposed to the permanent storage of a disk drive (described below). The amount of memory significantly influences the speed and ability of the PC to complete tasks. 512 megabytes (MB) is recommended for most appraisal applications. One to two gigabytes (1-2GBs) of RAM is common and affordable in today’s PCs.

## Disk Drives

An internal non-removable *disk drive* is the PC's filing cabinet, the physical device which permanently holds all the software and information within the computer. Using today's large-capacity disk drives combined with software tools for indexing large quantities of information, your computer can become the sole repository for photographs, listings, reference documents, video files, court documents, letters, and invoices, leading to a practically paperless appraisal office.

Disk drives with 100 to 300 gigabytes (GB) are common and inexpensive in today's PCs and should meet most appraisers' needs. 500GB drives and disc arrays (cabinets with multiple disk drives) are within financial reach for PC users with very large data storage needs.

It is not just the size of a disk drive, but the speed at which the PC can read from and write to the disk drive, which determines the price. A 100GB disk drive spinning at 10,000 RPM can cost three times as much as a 500GB drive spinning at 4,500 RPM, because it can deliver information to the user three times as fast. Fast input/output greatly influences the speed in which work can be accomplished and is particularly important when working with large files such as commercial narrative appraisals, graphics and video. The speed of a disk drive should be as important a feature as the storage capacity when considering a purchase; the savvy buyer will balance the two.

Today's disks are available in 4,500, 5,400, 7,200 and 10,000 RPM speeds. The 4,500 RPM disk drive is common in affordable portable PCs. A 5,400 RPM drive is an indicator of an upgraded portable and 7,200 RPM disk drives are found in high-end portables and most desktops. The 10,000 RPM disk drive is normally found in high-performance desktop PCs and disk arrays.

## PC Files and Folders

While they are not really 'components' of a PC, files and folders are important concepts related to computer memory and storage. *Files* are the electronic versions of documents stored on the computer. When you are typing information using a software program such as Microsoft Word, your words are in the computer's temporary memory (RAM). To permanently keep that information, you must save the document, and at that point, a file is created on the computer's hard disk. You can also create a new file by making a copy of an existing file.

When you save a file, the software application allows you to choose a name for the file that is meaningful to you. In the early days of computing, you were limited to only eight characters, which led to some very cryptic and inventive file names! However, today's computers and software allow you to create names up to 256 characters, including spaces and some special characters -- a filename today can be an entire sentence.

Each file created on the computer has as the final part of its name an *extension*, an additional 3 characters preceded by a period. The extension uniquely identifies the software program which created this particular file. For example, the extension for Microsoft Word files is ".doc". Identifying files by extensions allows the computer (and

the computer user) to immediately recognize the type of a file – formatted text, video, audio – and which software application is needed to properly display or modify the contents of the file. File extension lists can be found on the web at various places, such as <http://www.saugus.net/Computer/Extensions/>

The computer allows you to arrange your files into *folders*, logical groupings of files. Folders on the computer serve the same purpose as they do in a filing cabinet: to help you organize information. You can create as many folders as you like, name them however you like, and use them for any purpose you like, much as you would in a regular filing cabinet. Folders can contain other folders, in addition to files. For example, you might create a folder named “2006” to contain all that year’s appraisals, and within the folder “2006” you can create an additional folder for each appraisal, to hold all the documents related to that appraisal.

## **Operating Systems**

The PC *operating system* (OS) is the master software which controls everything on the computer. It is the conductor coordinating commands between the PC hardware and PC applications. There are two major vendors of operating systems used on today’s PCs: Apple and Microsoft. UNIX and other operating systems may run on some personal computers, but they have limitations and are not recommended for appraisers.

Application software is written for a particular operating system. For example, Microsoft Word and Excel are designed and built to operate on a Microsoft platform, and up until a few years ago could not be used on an Apple machine. However, recent advances in software compatibility allow both Microsoft and Apple users to share these applications. Most appraisal applications are available for the Microsoft operating systems.

Microsoft XP and XP Professional are the current operating systems of choice for an appraiser, and are very robust compared to previous Microsoft releases. XP includes an enhanced Plug-N-Play (PNP) feature, which provides automatic detection of new hardware such as printers, memory upgrades and cameras. This means that the computer user need no longer worry about compatibility issues between a new hardware device and the operating system.

## **Compact Discs (CDs) and Digital Video Discs (DVDs)**

Today almost all PCs are sold with inexpensive internal combination *CD/DVD drives*, devices which allow you read from and write to CD and DVD discs. The standard model drive is read/write for CDs and read-only for DVDs; this means you can both read from and write to CDs, but only read from DVDs. For example, you could use the drive to a) play a pre-recorded audio CD; b) play a pre-recorded DVD movie; or c) write information (files or music) onto a blank CD.

An upgrade to a writeable DVD drive is recommended, because CDs and DVDs are commonly used today for backing up and sharing files. CDs store about 480MB – the size of about 50 large files - and DVDs store some ten times as much. More expensive dual layer and other DVD formats provide additional storage, and will become more

common in the future. Clients often want electronic copies of appraisal reports, and the writable CD provides an inexpensive solution when a report is too large for email or web delivery. The larger capacity of writable DVDs is useful for creating backup copies of entire folders or groups of files from your computer as a safeguard against losing your work.

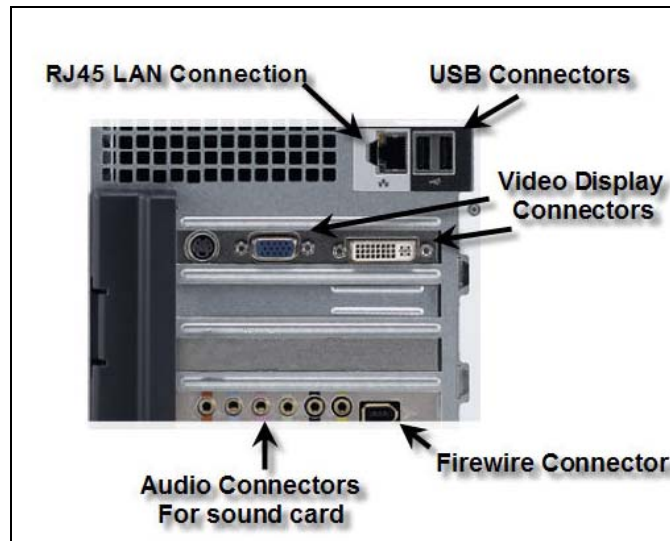
## **PC Connections**

In order to fully utilize your PC, you will need to connect it to different kinds of external devices – a printer, for example. Today’s standard PC comes with various connection outlets called *ports* or *interfaces*. Standard on most PCs are the following:

- Local Area Network (**LAN**) port. An oversize telephone connector (RJ45) used to connect a PC to a high speed network.
- Universal Serial Bus (**USB**). A common communications port widely used by all equipment manufacturers to simplify equipment hook-up. Examples of USB devices are printers and camera memory card readers.
- Video interface. A connection point for a video monitor/display. Desktop PCs may have more than one video connector allowing for multiple displays. Portable PCs normally have one video connector for connecting an external monitor.
- Sound ports. These may include headphone and microphone connections. Desktop PCs usually include a high-fidelity sound component.
- Firewire (IEE 1394). A high-speed connection developed for copying large video files to a computer. Newer USB connections can provide comparable speed, eliminating the need for Firewire.

The following additional connectors are available on most modern PCs, but their use is now largely obsolete:

- Serial and parallel ports. Used for outdated communications and equipment, displaced in most cases by the USB port.
- Telephone modem connector. A common telephone connector for low-speed communications over the phone via a modem.



## PC Monitors

*Monitor* is another name for the television-like display attached to your computer. The PC monitor has evolved from the simple television-type Cathode Ray Tube (CRT) to the more popular flat panel display.



A CRT display is inexpensive and available in screen sizes varying from 14 to 21 diagonal inches. Flat panel displays are available in a variety of sizes and features, such as a swivel which allows you to select a portrait or vertical screen orientation. Use of a vertical screen orientation for completing appraisal forms can speed up the work process by allowing you to view entire forms at a glance.

The use of a *dual display* (two monitors) on one PC enhances productivity enormously. You can simultaneously view a research web page on one display and an appraisal document on the second display, easily comparing or copying information. Portable PCs have a built-in auxiliary video port for connecting a second display to augment the limited size of the notebook display. Desktop PCs require the addition of an inexpensive video card. The Microsoft XP operating system makes it simple to use a dual display.

## Printers

*Printers* are available in a variety of types with various options. Laser printers, available in color or black-and-white models, have a higher initial purchase price over ink-jet technology but are less expensive to operate. Inkjet printers, some selling for less than the price of an ink cartridge, have a low initial cost and provide a good solution for low-volume use with very good photo-quality color.

Combination printers (also called “all-in-ones”) offer faxing, copying and scanning in addition to printing. This combination device provides a small footprint and requires a lower initial investment than separate devices. The downside of using an all-in-one device is that if it breaks, it can significantly impact your productivity. Equipping an office with both a high-volume black-and-white laser printer and an all-in-one printer is the most economical solution and also provides a backup printer.

		
HP Laserjet 3600n Color Laser Courtesy of HP Inc	HP Laserjet 3502 Black & White Laser Courtesy of HP Inc	HP Officejet 7310 Color All-In-One Ink Jet Courtesy of HP Inc

Most standard appraisal forms are a legal-sized document (8.5” by 14”). Not all printers can print legal-sized documents. When researching a printer for a possible purchase, ensure it can print on legal-sized paper. A printer with two paper trays is helpful for high volume printing, but usually not necessary for the small appraisal office. Another useful printer option is an envelope-printing feature. Some appraisal tools and most word processing applications include envelope and label printing options, which are convenient and provide a professional look to correspondence.

Today’s printers include a USB interface for easy connection to any single computer. In a work group setting, it may be desirable to allow multiple computers to use the printer simultaneously. A *print server* is a small electronic box which connects the printer to a network of computers or allows multiple computers to share a printer at the same time. Printers with built-in network interfaces are also available, but cost more than printers with only a single USB connection.

## Scanners

*Scanners* offer the ability to convert a physical picture or text page into a computer file. Text documents may be scanned and treated as a “picture”, or can become an editable text file when using text scanning software such as Omnipage’s OCR.

A scanner can be purchased as a stand-alone device or with an all-in-one printer. Scanner size is important. Letter-sized scanners are inexpensive and readily available. Legal-sized scanners, the standard in the real estate industry, are harder to find and more expensive.

## **Fax Machines**

A *fax machine* is a scanner or copier with a phone connection. A fax machine copies a document from one location to another sending the copy over phone lines or the internet. PCs equipped with fax software may send and receive faxes. A fax machine includes a printer for printing incoming faxes. Some fax machines include an optional USB connection to the PC for scanning and printing.

Fax services provide an alternative to owning a fax machine. Fax services such as Maxemail ([www.maxemail.com](http://www.maxemail.com)) are a fax relay service. They provide a dedicated locale and toll-free phone access numbers for receiving faxes. A fax service receives the fax and forwards it to you in an email, further facilitating the paperless office. This type of service is especially useful for mobile users.

## **PC Software**

*Software* is a generic term for the programs that operate on a PC. The term software evolved as a differentiation from *hardware*, meaning all the physical parts of a computer which we have just discussed.

A *computer program*, also called an *application*, is software that does a specific task or set of tasks. The PC operating system is a program or a group of programs and thus is software. Microsoft Word is a *word processor*, a type of software that allows you to create, format, and print documents. The card game of Solitaire, found on most PCs, is another example of software.

Software comes from various sources. There is a great variety of “freeware” (no cost) and “shareware” (minimal cost) available on the internet. More narrowly-focused software, such as that specific to appraisal, is available for purchase from several vendors.

## **Appraisal Applications**

Three widely-used appraisal software products are:

- ACI (<http://www.aciweb.com>)
- ClickForms (from Bradford Technologies, <http://bradfordsoftware.com>)
- WinTotal (from a la mode, - <http://www.alamode.com>)

Each of these products provides industry-standard forms and tools for completing residential and commercial appraisals. None is used for narrative appraisals, although each includes some features (such as photo sheets) which are useful for narrative reports.

An aspiring appraiser should defer a decision to purchase an appraisal application until after working with a mentor, who can educate the novice on a preferred product. Additionally, the mentor may have a license which allows the trainee to use the appraisal application for free or for a reduced fee.

When selecting an appraisal application for your business, you should ask yourself questions about your needs and your budget. Will you be doing mostly standard residential appraisals, or will your business include complex land and commercial work? How much can you afford to spend? If your budget does not allow you to purchase a higher-priced product, how will that affect your productivity? Can a less expensive product be upgraded later?

Read about the products on their web sites to learn about their features. Each of the software vendors will differentiate their features from their competitor's. Each will have a specific niche. For example, WinTotal has many add-on features, including turn-key web-development products for creating your own business website with integrated customer ordering, payment, and appraisal delivery. ClickForms markets themselves as the "When downtime is NOT an option" solution. A rather new feature in both Clickforms and WinTotal is the ability to automatically transfer comparable sales information from listing services directly into appraisal reports. This process is called downloading, and can save time and reduce typing mistakes.

Other features to look for in appraisal applications include integrated location maps, sketching tools (the better tools such as APEX require a purchase), location GeoCoding, flood map zone information, flood map downloads (usually a fee service) and a PDF generator for creating Adobe-compatible print files for distributing appraisals by email

When researching potential software purchases, review comments and concerns from other active appraisers in User's Forums and Groups to help you make a well-informed purchase decision. User's Forums and Groups are discussed in more detail later in this chapter.

Don't overlook web-based training, tutorial documents, and video clips in addition to free demos. These online documents can provide insight on using appraisal products.

Learning an appraisal application requires focus and time; do not underestimate the effort required to become productive. Changing to a new appraisal solution later will require a reinvestment of time and effort, when you may also be trying to meet client demand. This can be frustrating and lead to mistakes. Do the research fully the first time to avoid this reinvestment.

## ***The Web***

"The Web" has revolutionized access to information for every type of business, and the area of real estate is no exception. Real Estate agents now market their inventories to geographically dispersed clients. Potential home buyers can research the demographics

of potential new neighborhoods. Google Earth and Microsoft TerraServer supply free aerial views of most locations.

An appraiser can use the internet in a variety of ways, particularly in researching property values and neighborhood economics. The Multiple Listing Service (MLS), a fee-based real estate listing service, is facing significant competition from new real estate information service providers including Yahoo. Zillow.com is a website that offers free home valuation services on the web; Yahoo.com has a similar service. The smart appraiser will embrace the web and use the emerging competing services to facilitate work assignments.

Popular fee-based service providers for comparable sales data include:

- DataQuick (<http://www.dataquick.com>)
- MetroScan, from First American Real Estate Solutions (<http://firstamres.com>)
- Multiple Listing Service (contact your local real estate board office)
- National Data Collective (<http://www.ndcdata.com>)
- RealQuest from First American Real Estate Solutions (<http://firstamres.com>)

Commercial real estate service providers include:

- LoopNet (<http://www.loopnet.com>)
- CoStar (<http://www.costar.com>)

Additional web-based information services for appraisers include:

- Government offices such as the tax assessor and public recorder.
- Police and fire departments.
- Real estate brokerage houses.

The web is also perhaps the most important tool for promoting an appraisal business. A professional web site with marketing and contact information is as important as development of local clients for the successful appraisal business.

## **User Groups and Forums**

Appraisers learn from and contribute to web-based User's Forums and Groups by posting comments, questions and best practices. While there are countless forums and user groups, the authors have found the following to be beneficial.

Yahoo user groups - <http://groups.yahoo.com>

Registered Yahoo members (free service) can search the index for various users group. At the time of this writing, a keyword search of "Real Estate Appraisal" yielded 89 user groups varying from geographically focused user groups to product-specific user groups. The following are a select sampling:

ACI – <http://groups.yahoo.com/group/ACI-UsersGroup/>

An alliance of Professional Appraisers and Software Professionals utilizing ACI Appraisal Software focused on the technical support issues, appraisal technology issues, and other industry related issues.

Total2000UsersGroup - <http://groups.yahoo.com/group/Total2000UsersGroup/>  
An Unofficial WinTOTAL / Pocket TOTAL group not sponsored by a la mode, Inc. Additional topics include general appraisal and the various a la mode products including web-based solutions.

Mobile Users Group - <http://groups.yahoo.com/group/MobileAppraiserGroup>  
An unofficial mobile appraisers and professionals technology forum with a focus on mobile technology including but not limited to products such as pocket PCs, laptops, tablet PCs, Disto measurement tools, GPS mapping tools, etc.

Bradford Users Forum - <http://bradfordsoftware.com/cgi-bin/yabb/yabb.cgi>  
An official user forum sponsored by Bradford Technologies.

Appraisers Forum - <http://appraisersforum.com/>  
A Real Estate Appraisers user forum.

Appraisal Institute - <http://www.appraisalinstitute.org/default.asp>  
A membership forum and source of appraisal information.

## Email

For most businesses, email is now the preferred means of communications, even more so than the telephone. Email provides a permanent record of an exchange and can include photos and graphics in addition to text. It can be distributed in bulk or forwarded, and original messages can be included in replies. Email does not require someone to answer in a real-time manner like a telephone. Appraisers receive work requests via email and fax, and often send the completed appraisal to the client by email.

Email services are usually obtained from an Internet Service Provider (ISP) along with general internet access. ISPs were originally small businesses that provided a bundle of internet-based services. Today's typical ISP is a large corporation, such as a phone company or specialists such as EarthLink and America Online (AOL). Small ISPs still serve select communities, but pricing pressures and economies of scale have forced many small providers out of business when a large provider moves into the market area.

An ISP transports email messages much like the US Post Office does with letters ("snail-mail"). Where and how you view your email is dependent upon the PC software called an *email client*.

There are two basic types of email clients:

- Local to a PC. Email messages are created and stored on the PC, and transported between the PC and an ISP's email host. Three common local clients are Microsoft Outlook, Outlook Express and Eudora. The advantage of a local email client is that you can view previously-received messages and compose new

- messages while not connected to the internet, most likely using a portable computer.
- Web-based email. The PC's web browser is used to view, create and send emails on a remote email host computer. Web-based email has many advantages and a few disadvantages over a PC-based client.

A major advantage of remote web-based email is that the service company or ISP is responsible for storage of your messages, including keeping them safe with backup and recovery procedures. Another advantage is that you can access your email from any computer with a web browser. The biggest disadvantage is that your messages reside on the remote host; so in order to review messages, you must have access to the internet.

## **PC Viruses**

PC *viruses* are small software programs distributed by email which can perform unwanted and sometimes malicious actions on your PC. A virus can be relatively innocuous, installing annoying popup ads; or it can actually destroy data or key parts of your operating system. Viruses have become the curse of an otherwise efficient and affordable message delivery system, and every PC user needs a basic awareness of how to protect against damage from them.

Many ISPs employ a type of software called an antivirus scanner, a computer application which searches email messages and attachments for known viruses before they ever reach your computer. This type of scanning has helped reduce the spread of known PC viruses. Network equipment manufacturers are also adding antivirus scanning features to their equipment. However, detecting and filtering emerging viruses is usually reactive, based on learning about new viruses after they are in circulation.

A number of companies provide virus detection and scanning products for the PC. Most also provide automatic updates, which means that as new viruses are detected, their products can be upgraded to recognize them. You should invest in one of these products and not rely solely on your ISP virus scanning, as it is also possible for your PC to become infected from viruses on a CD exchanged with a friend or coworker. Norton and McAfee are the two largest providers of antivirus software. Both firms offer a wide range of products to protect and recover PCs.

## **Telecommunications**

In order to take advantage of the resources of the web and email, you must connect your computer to the internet -- the vast network of computers and information services which exists outside of your home or private office.

Several solutions are available for connecting to the internet. Internet service providers (ISPs), phone companies, and cable TV companies market various solutions with names and options that read like alphabet soup: ISDN, DSL, ADSL, FDDI, SBC, etc.

The following presents a brief overview of affordable internet network options for the small office, and a comparison table showing the relative transfer speeds of these services.

### **Cable modem services**

*Cable modem* communications are available from local cable TV companies, using the same cable (broadband) that provides TV programming delivery. Cable modem operators offer affordable and competitive services. Pricing and speed vary by service area and to a large extent depend upon what the competition is selling.

### **Phone & ISP services**

Digital Subscriber Lines (*DSL*) and Integrated Digital Subscriber Lines (*IDSL*) are communications services that share regular phone lines and coexists with existing voice services on the same circuit. These services are usually provided by local phone companies, and first became affordable in the early 90's.

DSL is the most popular network service for small businesses. It is also popular for home networking and competes with cable modem service providers. DSL is affordable and can be sized for different communication speeds.

### **Cellular (Air Cards)**

A cellular networking card can be used to provide a wireless internet connection in a portable computer. PCs can also connect to a cellular phone. Cellular phones and networking cards provide varying speeds depending upon the network type being used and the amount of traffic on the phone network. A Cingular EDGE network can provide reasonable speeds; slower speeds are common when a network is shared with others using data or voice services.

Cellular service providers are rapidly upgrading to high-speed digital services. Cingular's high speed service, HSDPA (High Speed Download Packet Access) provides connection speeds which are comparable to high-speed DSL and nearly twice the speed of most small office DSL services. The Sierra Air Card marketed by Cingular is an affordable PC Card that plugs into a portable PC for direct network connectivity.

The entry of cellular service providers into the high-speed wireless market marks the start of new competition and future solutions which should benefit the consumer with expanded choices and competitive prices.

### **Satellite Services**

Satellite ISPs should be considered only for remote locations due to higher prices and lower reliability. Companies such as Hughes's Direcway and WildBlue offer various service levels to meet small office needs. Initial equipment investment is around \$600 for fixed location solutions and up to \$10,000 for automatic mobile equipment. Monthly

subscription fees are dependant upon the speed of the service. Companies currently offering satellite internet include:

- Hughes's Direcway (<http://www.direcway.cc>)
- Starband (<http://www.starband.com>)
- WildBlue (<http://www.wildblue.com>)

## Comparison of Telecommunications Speeds

Note: the most common services, cable modem and DSL, offer 'asymmetrical' transfer speeds – different speeds for uploading (sending information) and downloading (receiving information). These differences are noted in the table below.

Name	Speed	Comment
Dial-up	56Kbs	Default speed with phone line
Cellular Air Cards	122Kbs EDGE 1.8Mbs HSDPA	
Cable Modem Services	128Kbs-768Kbs up/ 1Mbs-6Mbs down	
IDSL	144Kbs	Sometimes marketed as ISDN
ADSL (Asymmetrical)	384kbs-1Mbs up/ 384kbs-8Mbs down	<b>The most popular DSL product</b>
HDSL	1.5mbs	T1 transport alternative
SDSL (Symmetrical)	Up to 1.5Mbs	
Satellite	Various up/ Various down	High initial equipment fees.

## Wireless Networks

In order for PCs to use the internet and other resources such as printers, they must be connected to a telecommunications network. Prior to wireless technology, PCs connected to local networks and the internet by copper wires called LAN (Local Area Network) cables. Wired connections are not a problem for stationary desktop PCs, but wired connections are cumbersome for portable PCs due to their mobility.

In 2001 PC wireless solutions became fast and stable enough for corporate implementations and were soon followed by low-cost solutions for the small office and home network. Today, wireless cards and software are standard in portable PCs and sold as options for desktop PCs where wiring is not practical.

PC wireless solutions were originally developed for private network connections within the office and home due to their limited distance and speed. However, ISPs are adding wireless services to their service areas. Partnering with local governments, ISPs are now installing receivers called Access Points on neighborhood street lights near the homes and offices of potential customers. This expanded service is called “Wi-Fi”. Short for "Wireless Fidelity", Wi-Fi is an extension of wireless local area networks (WLAN). For detailed wireless network information including configuration and security, refer to <http://computer.howstuffworks.com/wireless-network.htm>

PC wireless solutions can be divided into three types:

1. Personal wireless using a product called BlueTooth. Bluetooth is a personal, short distance wireless solution for personal communications devices such as headphones and PC attachments.
2. Private wireless local area networks (WLAN) employing any of the three original wireless standards.
3. Wi-Fi networks using existing wireless technology with extended distance antennas and new technology such as WiMax with a proposed 1 to 30 mile range.

The following compares wireless solutions:

<b>Wireless Solution</b>	<b>Speed/distance</b>	<b>Comment</b>
802.11a	Up to 54Mbps in the 5GHz band / Shorter range than 802.11b, blocked by trees and other objects.	High speed, with limited distance when traveling through walls etc.
802.11b	Up to 11Mbps in the 2.4GHz band / 300 feet from base station (access point).	300 feet from base station. 14 channels available in the 2.4GHz band
802.11g	Up to 54Mbps in the 2.4GHz band / Shorter range than 802.11b, blocked by trees and other objects.	14 channels available in the 2.4GHz band (only 11 of which can be used in the U.S. due to
WiMax (802.16)	2 to 11GHz, and 10 to 66G / 1 to 30 mile range proposed.	Defined standard/ Emerging solution for long distance use.
Bluetooth	Up to 2Mbps in the 2.45GHz band / About 30 ft without obstruction	Best suited for connecting cell phones, headsets, and PCs for short intervals and distances.

## **Private Networks**

A *private network* is called an intranet or a local area network. Once you are connected to the wider internet using one of the solutions previously discussed, an intranet will allow you to share information locally among multiple computers in your home or small office.

Without going into great detail, the dividing line between the internet and intranet is usually a network device called a *router*. The router is an inexpensive device available from companies such as NetGear or Linksys. Router functions are sometimes included in the ISP connection equipment installed at your residence or office. The router should provide a *firewall* between your local area network and the internet. A firewall is special software that prevents outsiders from accessing your intranet.

## **The Tool Box**

The following section discusses various PC applications and miscellaneous tools useful to real estate appraisers. The topics and products presented are not an extensive list, but rather a collection the authors have found useful.

### **Adobe Acrobat and Adobe Reader**

Adobe Systems distributes free software for the exchange of documents in a universal format known as the Portable Document Format (PDF). PDF was developed to allow efficient electronic distribution of large documents. A PDF file will look the same on the PC screen and in print regardless of what kind of computer you are using or which software created the document. Additionally, a large document can be compressed for fast downloading. PDF files display text and pictures as if you were looking at the original.

While the PDF reader software is free, the software to create and edit PDF files is not. Adobe Acrobat is the basic file creator offered for sale by Adobe Systems. Some appraisal software is sold with an internal PDF writer, which can save the appraiser the expense of purchasing a separate PDF application to create PDFs. However, without Adobe Acrobat, a PDF file cannot normally be changed once created.

Security can be set on PDF files to limit unauthorized changes to the content. This feature is not 100% secure because third-party tools exist which allow unauthorized editing.

### **PhotoShop**

Photoshop, also from Adobe Systems, is perhaps the premier still-photograph editor. Generally the content of appraisal photographs should not be modified, but occasionally lighting conditions do not allow for the taking of quality photos. Lightening up dark photographs is a frequent use for PhotoShop by appraisers, and it can be used with varying success for darkening over-exposed photographs. . PhotoShop is also used to resize pictures when this feature is not included in the appraisal application. The three

appraisal applications previously discussed do include photographic editors with limited functions that are adequate for simply incorporating pictures into documents. Various inexpensive and free photographs editors are also available. Most digital cameras come with a low-cost editor, so experiment with and evaluate the adjustment features you already have before purchasing an additional editor.

## Snag-It

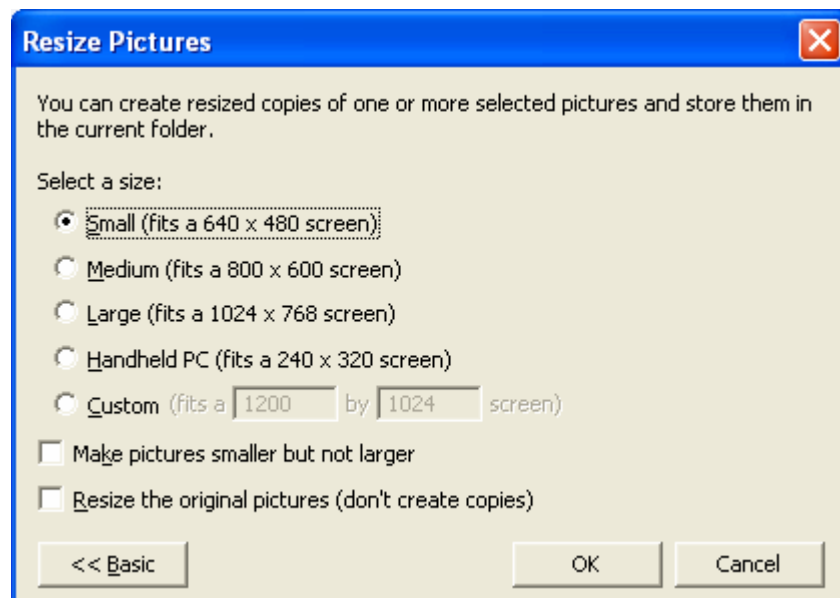
Snag-It is an inexpensive PC screen-capture utility. It is like a camera, able to take a picture of the screen contents and save the image in various file formats. Snag-It can capture a portion of the screen image, a whole screen image, or a scrolling display. It is very useful for collecting non-printable web information. Captured screen shots can be save as images for incorporation into a report, or for printing on a standard paper size.

Snag-It includes many features such as a cropping and highlighting, and tools such as a presentation creator. It is available on the web at <http://www.techsmith.com>

## Microsoft Tools

Microsoft offers a number of freeware tools called 'PowerToys' on the web at: <http://www.microsoft.com/windowsxp/downloads/powertoys/xppowertoys.msp>

The Microsoft Image Resizer is particularly useful for reducing the size of pictures (JPG images) for incorporation into narrative documents. Using the Image Resizer, you can reduce the sizes of selected images, or even the contents of an entire folder, with a simple right-click of the mouse.



The Image Resizer creates a new, resized copy of the image, and will not modify the original picture unless specifically requested.

## Google Tools

Google offers freeware tools on the web at <http://www.google.com/intl/en/options/>

Among the many free Google tools, the following are highly recommended for appraisers. They are:

- Google Earth: an aerial mapping service which ties in with Google Maps for driving directions, etc. Google Earth Plus is a recommended optional upgrade adding GPS support, spreadsheet imports and drawing tools. Google Earth Pro, a \$400 upgrade option, has many additional features and is intended for corporate users.
- Google Desktop: a tool for indexing PC content and conducting searches of PC and web content. An extremely powerful tool for finding files and information such as pictures and old appraisals. Installation is a simple download from the Google site, followed by an automatic indexing which can last many hours depending on the PC content. The PC can be used while indexing takes place.
- Google Toolbar: a search box added to the web browser including such features as:
  - o Auto-fill for filling in forms with predefined user information (name, address, etc).
  - o Spell checker
  - o Popup blocker to eliminate web popups

## Appraisal Sketching Tools

An important part of every appraisal will be the improvement sketch, a diagram which depicts the property's room placement, the exterior walls with dimensions, and the major fixtures such as stairs and fireplaces. Sketches should show gross living area (GLA) in square footage (SF) and non-GLA square footage for areas such as garages and other structures contributing to value.

Two sketch applications are widely used. They are:

- APEX from ApexSoftware (<http://www.apexwin.com>)
- WinSketch from Bradford Technologies (<http://bradfordsoftware.com>)

Versions of these sketching tools are also available for tablet PCs and Personal Digital Assistants (PDAs). Sketches developed in the field can be later transferred from one of these tools to the office PC.

Appraisal sketches should be done in accordance with commonly accepted local best practices, as well as adhering to ANSI Z765-2003, the American National Standard For Single-Family Residential Buildings published by the NAHB Research Center, a subsidiary of the National Association of Home Builders (<http://www.nahbrc.org>).

## Measurement Tools

Taking accurate measurements of a subject property's dimensions is of singular importance to an appraiser. Various tools are available for measuring. Tapes measures and measuring wheels are the most common and affordable tools. Both are accurate enough for appraisal work when used correctly; however, they can lead to inconsistent results. As an example, a measuring wheel should never be used on a rough or uneven surface as this can induce errors. One hundred foot cloth (fiberglass) tape measures are recommended. Avoid long steel tape measures as they can be a source of injuries.

Electronic measurement devices are more accurate and faster than tape measures and measuring wheels, giving the appraiser a productivity advantage. Various inexpensive electronic "tapes" are available from home improvement stores, but these devices are seldom accurate and may be difficult to use in certain settings.



The Disto Laser Measurement product line from Leica Geosystems is the acknowledged leader in measurement tools. These tools are expensive, but well worth the investment. The A3 is the least expensive Disto, listing for \$299.00; it has a 350' range with 1/8" accuracy. The A6 Disto is the flagship handheld electronic measuring tool with a 650' range, 1/16" accuracy, built-in telescope, and Bluetooth wireless for measurement transfer to PDA and tablet PCs. The A6 lists for \$649.00.

## Tablet PCs

A *tablet PC* is a small portable PC that can be used with a detachable keyboard, or with a writing stylus on a touch screen which recognizes natural handwriting. Tablets vary in size, but are usually about the size of a pad of letter-sized paper.

Tablet PCs are commonly available in two formats

- A convertible with an integrated keyboard and display that rotates and can be folded down over the keyboard.
- A slate style, with a removable keyboard.



Tablet PCs are designed for a rugged outdoor environment and use a specific version of the Microsoft XP operating system. Tablet PCs are more expensive than portable PCs and are about twice the price of desktop PCs.

### Personal Digital Assistants

Personal Digital Assistants (PDAs) are small handheld digital computers with limited functionality. PDAs vary in size, but the “Palmtop” name made popular by Palm Computing best describes their intended size. PDAs were originally envisioned as an organizing device to support busy people in managing complex lives. Original functionality was limited to a notepad, calendar, calculator, money exchange rates and simple communications with keyboards designed for thumb-typist and pen stylus input.



Today’s PDA has increased functionality and computing power with enhanced telecommunications. Many include features such as integrated Bluetooth, cellular phone, pager, email, wireless LAN and GPS receivers. Touch screens are common as is natural handwriting and speech recognition. Commonly available software includes web browsers, Instant Messaging (IM), graphics, word processing, Adobe PDF and various custom tools including appraisal and sketching applications.

## Cameras

Digital cameras have practically replaced film cameras for appraisal work due to their low cost, ease of use and photographic quality. Appraisal software packages from the leading vendors include digital photography tools for photo retrieval (downloading from the camera to the PC) and picture adjustments (lighting, scaling, rotation, etc.).

Digital camera *resolution*, a measurement which expresses the level of detail in a photograph, is measured in millions of *pixels* per inch (megapixels). A pixel (short for picture element) is a single point in a graphic image. Three megapixel cameras are now very inexpensive. Higher resolution cameras (five megapixels and up) provide greater photo quality but are more expensive.

Recommended features in a camera for an appraiser include:

- Three to five megapixel resolution.
- A replaceable memory cards with a minimum of 256MB. Memory cards store the pictures. Memory is inexpensive; always carry an extra card or two on an assignment. Memory cards also can go bad; be prepared.
- Internal flash. Pop-up and external attaching flashes tend to get caught on clothing and other equipment. A tilt-up flash can break off. Avoid cameras with any external protrusion other than the lens.
- Replaceable rechargeable battery(s). Carry spare batteries and an inexpensive car charger. Ensure the camera battery is easy to remove and replace. Avoid cameras requiring tools for battery replacement.
- Carrying strap. A good strap provides hands-free carrying and helps avoid dropping the camera. Some cameras such as the Olympus 5050 provide a shoulder strap which connects to both sides of the camera. Smaller cameras such as the Kodak V570 have a wrist strap which should be replaced with a shoulder strap.
- Wide angle lens. A wide angle lens allows you to photograph more features in small rooms with a single photo. It is also useful for taking complete front photos of large structures in confined locations. The Kodak V570 possesses two lenses, one for normal 39 to 117 mm photos and one 23mm ultra-wide angle lens.



In addition to still photographs in appraisal reports, some appraisers specializing in legal work assignments take video for court presentations. The video provides further support for their value option. Many of today's still cameras include a video feature, but taking video requires more memory than still photos. If you foresee a need for video clips, a 1 to 2 GB memory card is recommended.

Always take high quality original photographs, and adjust the resolution and size within the appraisal report to convey the subject truthfully. Save the higher quality original for your files and legal assignments.

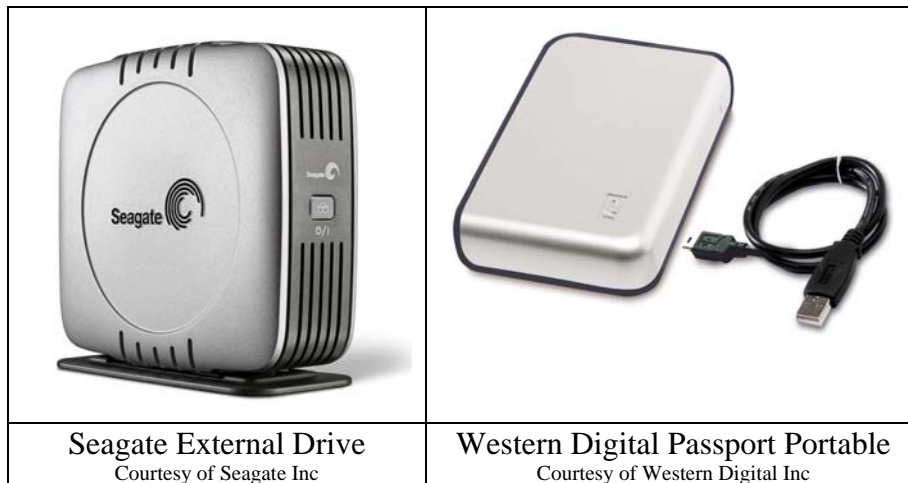
## External Disk Storage/Backups

Making periodic copies of the information on a PC's disk drive is important. Files can be destroyed in a number of ways including user error, PC viruses, or when a disk becomes corrupt or breaks.

PC information can be protected in a number of ways. The simplest is to copy individual files to a CD or DVD. While simple, this method can be time-consuming, and it protects only the files copied. Some appraisal software companies sell services for file protection; a la modes' Vault service is such an example for safeguarding appraisals and PC configuration files.

The best protection solution involves creating a copy of all information on the disk drive. This copying process is called making a backup. Historically, computer users have used tapes, floppy disks, and now CDs and DVDs for making backup copies, but today's technology has moved to the use of inexpensive external disk drives which can perform backups more easily and quickly. Disk drive manufacturers are now producing entire product lines aimed at the backup and external storage market.

An external disk is a self-contained disk in a protective housing with a power cord and a USB connector. These disk drives often include PC backup software. Available options include a Firewire interface for faster data transfers and multiple disk configurations called "arrays" which provide more space and advance data protection options.



Two common backup techniques include file copying and disk cloning. Both have advantages. A file copy backup is adequate for protecting individual files and groups of files. Backing up selected groups of files can be completed quickly, and individual files can be easily recovered by copying them back to the PC's internal hard disk. The

disadvantage of the file copy backup method is that it does not protect against a complete PC disk drive failure, as opposed to the loss of individual files.

Cloning, as it name implies, creates a complete duplicate of the source disk drive. The cloned copy includes the PC operating system, as well as file indexes and all data files. Individual files can be easily recovered from a cloned drive, but additionally a cloned drive can be used as an immediate replacement for a failed drive with little lost time. The cloning process is also a fast method for upgrading a PC internal disk. Doing a monthly or quarterly disk clone is a good practice. .

Combining the two backup methods is the surest way to safeguard data; use file copy often to back up current work, and cloning periodically to provide complete protection. Today's inexpensive disk drives make this easy and affordable. Store cloned drives in a separate location from the PC. A fireproof file cabinet is recommended.

## **Global Positioning Satellite Tools**

Global Positioning Satellite (GPS) tools are a valuable navigation aid for appraisers. These tools come in many forms: handheld models, receivers that mount on automobile dashboards and units that connect directly to a PC. The PC-connected GPS which interfaces with mapping software provides the best value and can be used for route planning, location maps, and route navigation. The mapping software itself provides other distinct productivity aids, including the ability to integrate computer maps into reports and spreadsheet.

Combining GPS with other mapping products such as Google Earth or USGS topographic maps provides the appraiser a solution to identify locations with confidence and precision. The combined tools can aid the appraiser in locating parcels without an address and in identifying nearby value-influencing features such as streams, mines and abandoned dumps.

Reference the following web sites for addition product information:

- DeLorme map products (<http://www.delorme.com>)
- Garmin International (<http://www.garmin.com>)
- Magellan GPS (<http://www.magellangps.com>)
- Microsoft Streets and Trips (<http://www.microsoft.com/streets/default.mspx>)

## ***Automated Valuation Modeling***

Automated Valuation Modeling (AVM) is a computer-generated valuation, based on the market value premise with limited adjustments for features differences, and using location data and other metrics to reach a valuation.

Some appraisers feel threaten by AVM; they see AVM taking away business. And in fact, this appears to be correct for simple valuations in which the specific improvements and property attributes are not salient. Some financial intuitions use AVMs in place of drive-by appraisals for small loans or equity lines of credit. They are willing to take a small

risk on a \$100,000 equity line of credit when the AVM shows the market price considerably higher for clients with good credit and/or a long-term relationship.

Appraisers too can leverage AVMs for checking their work. Sometimes an AVM value estimate can alert the appraiser to a market change or other event influencing their valuation. Some appraiser information service companies such as RealQuest provide AVMs as an optional pay for use service.

## **Summary**

This chapter provides a high level introduction to technology tools and services current as of this writing, but new technology is emerging daily.

Microsoft is selling new operating systems, next year there will be another, and so on. Intel and AMD continue to develop faster processors. Printer companies are nearly giving away their printers which are now faster and more feature-packed than ever. Portable computing tools allow an appraiser to complete the appraisal while at the subject property, and then phone in the completed report. Handheld laser measuring devices increase productivity and reduce errors by transferring the measurements directly to portable or Tablet PCs. Fax service providers are replacing the aging office fax machine.

The successful appraiser must embrace technology to meet client needs and to remain competitive in the appraisal industry. The future will continue to provide better tools for appraisers to compete efficiently and effectively in a fast-paced, high-volume business environment.