So You're Thinking of Adding Multimedia Services: Some Basics to Consider

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Let's start with the meaning of **multimedia**; as used here it means combined text, sound, and graphics, frequently utilizing a CD-ROM product. Graphics can be still pictures, animation or video clips. The more elements involved in a multimedia package, the more complex the issues become. Many packages are, and most will be in the future, "interactive" which means the user is in control of what is presented and when. Interactive packages mean users will want quick response times. In this fact sheet, we will only address concerns about setting up PCs for multimedia presentations. A later sheet will cover the basics of creating multimedia applications.

Basic Requirements

Any PC you plan to use as a multimedia station will have to have the following to make effective use of current CD-ROM products: RAM (random access memory) needs to be at least 8MB (megabytes); 16MB will allow for new, RAM-hungry products that are likely to appear in the very near future. Hard disk capacity should be as great as you can afford, especially if you are thinking of moving into creating multimedia. Other hardware requirements are a super video graphics array (SVGA) monitor, a CD-ROM drive, a processor that is 486DX or Pentium, a sound card, a video (display adapter) card, and speakers.

Options

You can purchase a new PC ready for multimedia for between $2,500 and $3,000; some come with a one gigabyte (GB) hard drive. This is the easiest method, but often not financially feasible. The other option is upgrading an existing PC. There will likely be three elements required for multimedia upgrading: PC performance enhancements, multimedia hardware, and probably a new monitor.

Performance enhancements

In theory, a PC with 4MB RAM, 80MB hard disk, and 386 processor can, with the multimedia hardware, play multimedia CD-ROMs. Realistically, such a minimum configuration will produce disappointing results; the configuration itself is almost obsolete. (For instance, the new version of Windows will not run satisfactorily on a 386 machine.) For upgrading, the processor should be

at least a 486DX. As noted above, 8 MB RAM is good; however, 16 MB RAM will produce even faster results and allow for future enhancements in technology. After installing additional RAM, remember to run the PC's setup program and change the relevant settings. Adding more hard disk capacity may also be necessary. If the PC is more than two years old, you should consider replacing the hard disk rather than trying to supplement it. (Replacing or adding capacity to the hard drive also requires your reconfiguring the PC in order to register the new drive).

Multimedia

Multimedia adds several more devices that require loading into your system's RAM. If you are already loading your DOS "high memory" along with a mouse driver and network driver, you will probably find it impossible to squeeze the multimedia drivers into what little RAM remains available. Usually there is anywhere from 480KB (worst case) to 550KB of conventional RAM left for DOS-based applications. For some DOS applications that may be adequate, but for most there is a need for more conventional memory. One way to solve this is to install something like Quarterdeck's QEMM memory manager. Such a program will allow you to load more device drivers, if not all, into the high memory regions (leaving you about 610 KB conventional RAM). Note: many multimedia products are still DOS-based so this may be an issue for you.

Multimedia Hardware

Prepackaged kits are probably the quickest method of upgrading the PC for multimedia work; this is in addition to the performance upgrading. Such kits usually include a sound card with built-in CD-ROM interface, a CD-ROM drive, and more and more often speakers and a microphone. Generally the kits have some software installation disks, which once installed require you to reboot the PC in order for the changes to take effect. If you are buying a CD-ROM drive, consider purchasing the one with the fastest data transfer rate (DTR) you can afford as well as the fastest seek time. (Seek time is time required for a laser beam to locate wanted material on the disk; DTR is the time it takes to transfer the data from disk to screen.) "Quad-speed" is currently the fastest drive available; however, many units on the market are only single or double speed. (Due to their virtual obsolesence avoid single-speed CD-ROM drives.) Because of various compatibility problems it is best to buy an integrated kit rather than individual components.

Storage and Access

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Another concern is how data are stored and accessed on the CD-ROM. If buying a CD-ROM drive today, buy a drive that supports CD-ROM XA (extended architecture). "XA" products store "computer data" (text and graphics) and sound data in the same sector of a disc, which results in faster access. (Note: some drives are labelled "XA-ready" which means you will need to buy additional hardware to read XA CDs.)

Monitors and display

To achieve maximum graphics resolution you will need an SVGA monitor and an SVGA display adapter card (also known as a video card). A display adapter card stores and updates the monitor images. One concern is the number of pixels a monitor displays -- the more pixels the better the resolution (currently most SVGAs display either 800 x 600 or 1,024 x 768 -- the first number is pixels per line horizontally and second is the number of lines vertically on the screen). "Dot pitch" is yet another factor; the smaller the pitch the less visible the dot making up the image which makes it easier on the eyes. A .28 pitch is fairly standard, .25 is becoming common, and anything above .30 is very questionable for multimedia use. There is a relationship between pixels, color, and video RAM (a chip on the display adapter card).

The video RAM stores the information about the monitor's pixel grid. One element of the stored data is color information. Storing color data in 4-bits means only a 16 color display will be seen while eight bits of memory means one of up to 256 colors can be displayed by a pixel. With 16-bits, the options go up to 65,536 colors, and by using 24-bits a pixel could display any of 16.77 million colors. Needless to say, there is a down-side to increasing the number of colors and having greater screen resolution. As those two go up, so does the video RAM requirement. Using the lower of the two common SVGA displays (800 x 600) as an example, the screen has 480,000 pixels. To display an image with 256 colors (one byte -- 8-bits -- per pixel) the video RAM must be 480KB; at 16.77 million (three bytes -- 16 bits -- per pixel) the requirement is 1.44MB. Thus, you should consider investing in video cards with at least 2MB RAM; if you do not there will be trade-offs between colors and resolution. A related speed issue is how quickly the system can redraw screens. Upgraded machines will probably have a standard ISA 16-bit graphics card with 1MB DRAM in a 386 unit and some 486s. In that case, the redraw time will be very slow at higher color and resloution settings. Finally, the display adapter (video card) can become a data bottleneck; you will want one that has at least a 16-bit interface (this will require a 16-bit expansion slot if you are upgrading).

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There are several other factors to remember. With a VGA monitor the best you can do is 640 x 480 pixels and 256 colors, so it is best to invest in an SVGA unit. Screen size is also important: a 14-inch monitor is adequate for VGA displays at 640 x 480 but with an SVGA 800 x 600 display the image is somewhat distorted. With a 15-inch SVGA, the 800 x 600 configuration is fine, but there is a problem with higher resolutions. A 17- or 21-inch monitor is the best investment for quality images. Further, you will encounter monitors that build the screen image in one of two ways: interlaced and noninterlaced. An interlaced monitor requires two passes to build an image, while the noninterlaced does it in one. The noninterlaced image has less flickering, which is easier on the eyes. For growth, resolution, and color capacity try to purchase a 17- or 21-inch noninterlaced 72Hz vertical refresh rate monitor. (Such a 17-inch monitor costs about $1,000 and a 21-inch unit is in the $2,000 range.)

A final note on modems

If you are thinking of offering access to World Wide Web type material, be certain the unit's modem operates at at least 14.4Kbps (bits per second). Anything less will take much too long to build up images. (Note: some vendors released early model 28.8Kbps modems before standards were in place -- those can cause compatibilty problems. Also, while internal modems save work space, external modems can be moved from machine to machine.)

Happy multimedia-ing!

Next time we will explore creating multimedia.

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