

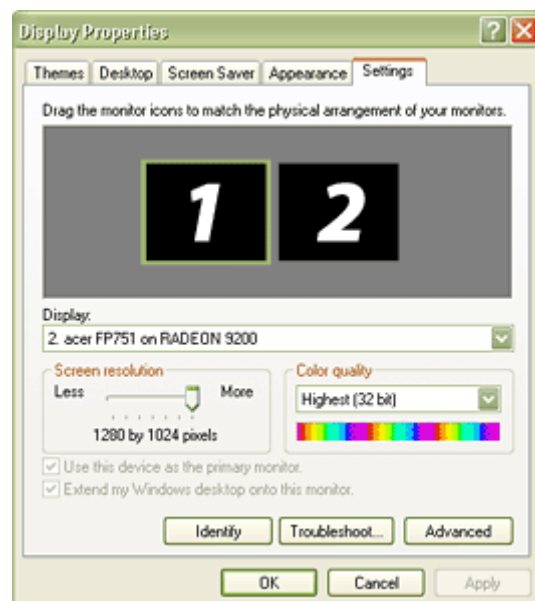
BUILDING
A DUAL MONITOR DISPLAY**Tech Tip 40 - Dual Display Desktop**

The ability to run multiple monitors off of one computer is nothing new, but such configurations are seeing a surge in popularity. The falling prices of LCD monitors, coupled with the desire to comfortably have as much on screen as possible, are leading this surge. It might be an even more popular upgrade if people were aware of the ease of installation and the relatively reasonable costs associated with it. To that end, this Tech Tip will take a look at some of the basic requirements and features associated with setting up a dual display desktop on a personal computer.

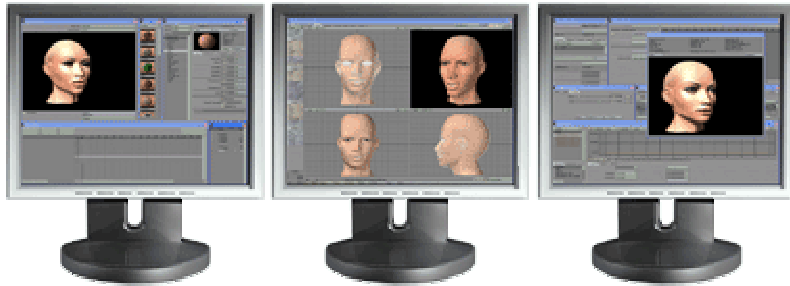
Software

Displaying your desktop on multiple monitors is natively supported by Windows XP, 2000, ME, and 98, as well as in the popular distributions of Linux. Although this Tech Tip will focus on configuring a dual display setup in Windows, it is possible to go much higher than two monitors if your needs and budget should allow.

With the proper hardware installed (to be covered in the next section), enabling dual displays is quite easy. Simply navigate to the “Settings” tab of the “Display Properties” screen in Windows, and where most people are used to seeing controls for one monitor, you will now see two. The two monitors can then be enabled (attached) / disabled, resized, and reoriented to match the configuration that they physically occupy on your desk. By selecting to “Extend my Windows desktop onto this monitor”, the cursor will now be able to leave the primary monitor and can freely navigate the second display as if it was all one surface. You



can move programs, icons, taskbars, and wallpapers onto the secondary monitor and start taking advantage of the increased desktop real estate. With this setup, a computer becomes much more convenient to use.



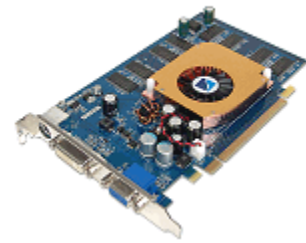
The typical home user may appreciate the extra space in order to spread out documents for easy reviewing without having to tab back and forth. On a more recreational level, perhaps they will utilize one monitor for their web browser, while the second one is used to display e-mail, instant messaging, MP3 playback, DVD video, and so on.

Another benefit of dual displays in the home can be experienced in 3D games. Many games are now supporting multiple monitors in order to enhance the experience. Unreal Tournament, Quake, and Microsoft's Flight Simulator are just a few of the series of games that support multiple monitors to allow the player to further immerse themselves in the action.

In business settings, dual displays may be even more valuable. In addition to being able to view multiple documents at once, some may just need more space to see what they are working on. Designers using AutoCAD can now drag all of their toolbars onto the second monitor and use the entire surface of the primary monitor as an uninterrupted workspace. Another example of the benefits of dual displays can be seen with day traders, who may need to be monitoring the activity of numerous stocks at once. Having one window hidden behind another may be not only be inconvenient, but costly, and multiple monitors might be an easy upgrade to justify when money is on the line.

Hardware

The software portion of the setup is easily addressed considering that the functionality is built into just about every operating system available. The hardware required for running dual displays requires a bit more consideration, but isn't anything that even a novice computer user can't figure out. One thing you obviously need to have is a pair of monitors. The second thing you need to have is a means for connecting these two monitors to the computer, which can be accomplished in a variety of ways.



For those building a system from scratch, perhaps the easiest way to connect two monitors is via a dual-head graphics adaptor, such as this nVidia GeForce 6600 PCIe card (<http://www.geeks.com/details.asp?invtid=PCX-PC6600-128MTV&cat=VCD>). The connectors on this card allow for either one digital and one analog, or for two analog monitors (using the included adaptor) to be connected to the system through the use of just one PCI Express x16 slot. There are also dual-head cards available for AGP and PCI; it is simply a matter of selecting the correct card for the slots available on your motherboard.



In addition to selecting the correct motherboard interface, it is important to select the correct display connections. The card referenced in the previous paragraph provides one DVI connection for a digital display, as well as one 15-pin VGA connection for an analog display. Through the use of an included DVI to VGA adaptor, owners can then run the combinations of monitors mentioned above. Other cards may offer two DVI connections (<http://www.geeks.com/details.asp?invtid=01-000080-XXX-DT&cat=VCD>) or two VGA connections. A VGA connection can be identified by the typical 15-pin (generally blue in color) plug that has been the staple on computers for years. A DVI connection is generally white in color, and is slightly wider than a VGA connection. Whether selecting a card for use with existing monitors, or buying the card and monitors all at one time, it is obviously critical to select components that will work together.

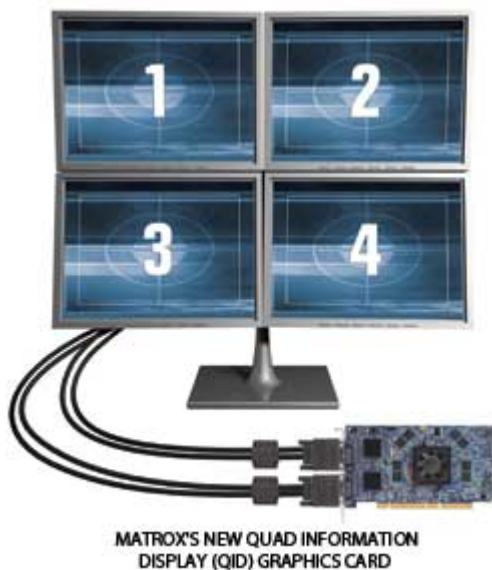
For those with an existing system that could benefit from dual displays, replacing the existing graphics adaptor with a dual-head card is an option, but it is not the only one. Another graphics adaptor can be added to the system, and the existing card can be kept. This is nice for financial reasons, or if the performance of the existing card doesn't warrant replacement.

The key thing to consider with this approach is to select a secondary graphics adaptor that uses a slot available on your motherboard, and that offers a display connection to match your monitor. Newer systems may feature more than one PCIe x16 slots which can make this happen, but you can also add a PCI card to any system currently running PCIe, AGP, or PCI graphics. The cards used in a dual display setup do not need to match, and it is acceptable to run a high end primary card with a bargain basement secondary card, or any combination of cards in between.

Trying to set up dual displays on systems with integrated video can result with mixed results. Expansion slots are generally available for graphics cards on systems with the video adaptor built into the motherboard, but using these slots on many systems like this instantly disables the onboard video. Those desiring

dual displays on such systems need to investigate whether onboard graphics adaptor can be part of the setup, or if two new connections need to be installed via either method described previously. But, some integrated video solutions will support dual displays, and may do so without additional hardware. For example, if the manufacturer includes the necessary connections, systems that utilize the Intel Extreme2 integrated graphics processor can run dual displays as is.

There are also specialty cards, such as the ones made by Matrox (<http://www.matrox.com/mga/corp/enterprise/products/highend.cfm>) that can allow up to four monitors per card, and multiple cards per system! Though not made for the gamer, these cards are great for stock traders, banks and enterprise server situations.



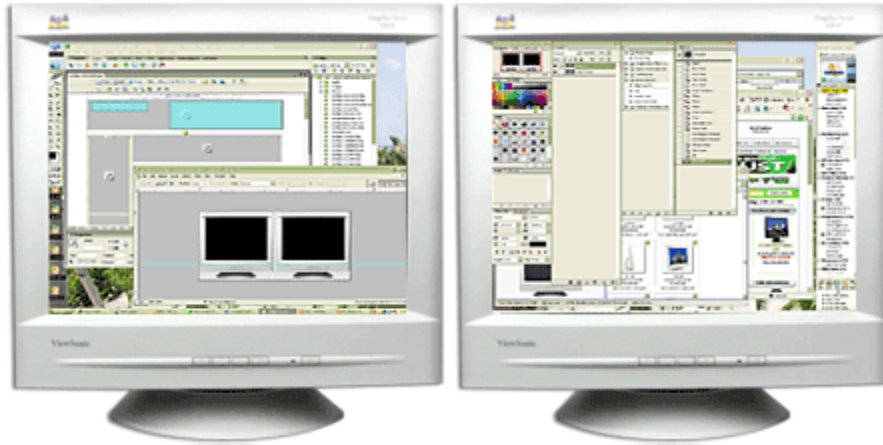
Notebook computer owners aren't left out of the loop on dual displays, either. Most modern notebooks feature a VGA connection that can either be used as the primary display or as part of a dual display arrangement with the notebook's integrated display. Not all notebooks allow for this, as some will only mirror the display onto the attached monitor, so it is best to check the features and specifications before making any purchases.

Benefits

Financially, two smaller monitors should be much easier to justify than one larger monitor. Two 17" LCD monitors (http://www.geeks.com/products_sc.asp?cat=538), or even two 19" LCD monitors (http://www.geeks.com/products_sc.asp?cat=540), generally cost much less than just one 20" LCD monitor (http://www.geeks.com/products_sc.asp?cat=532). Looking at the Geeks.com inventory, it can be seen that two typical 17" models will cost about \$400, while one 20" model will cost closer to \$800!

The price difference between two new smaller monitors and one new larger monitor is remarkable, but many people might already have something like a decent quality 17" monitor on hand. The value of a dual display desktop gets even better if you only need to buy one of the monitors. Many people retire perfectly good monitors just because they want to upgrade to a larger screen.

Simply adding another, similar monitor to the setup can be much more economical and provide even greater desktop real estate.



Desktop real estate is what this effort is all about. People want larger displays for generally three reasons: (1) to make the image larger and easier on their eyes, (2) to be able to fit more content on to the screen, and (3) just for bragging rights as bigger is better! Dual displays may be a good way to take care of numbers one and two, and it will help satisfy number three by scoring significant coolness points worth bragging about.

As a point of reference in the desktop real estate department, let's take a look at the maximum resolution you can run with either a single 20" monitor or two 17" monitors. A 20" Sony LCD monitor (http://www.geeks.com/details.asp?invtid=SDM-S204_B-DT&cat=MON) supports a maximum resolution of 1600x1200. Any one of the 17" or 19" LCD monitors at the links above will provide a maximum resolution of 1280x1024. Place two of these monitors side-by-side in a dual desktop setup and you have an effective resolution of 2560x1024. If your physical desktop makes it more convenient to configure your Windows desktop so that one monitor is above the other, instead of side-by-side, you could then have an effective resolution of 1280x2048. As you can see, the total area in the dual display configuration is far greater than that found on just one 20" monitor.



From an aesthetic stand point, people may like to have two of the exact same monitors on their desk. It is not necessary that the monitors in a dual display setup match in terms of size, brand, or technology (LCD or CRT). Any two monitors can work in a dual display setup as long as the connections on the monitor and the graphic adaptor match up. That said, there may be other reasons why someone would want to have similar, if

not identical, monitors in their array.

The display specifications are worth considering when adding a different type of monitor in order to create a dual desktop arrangement. Factors such as contrast, brightness, resolution, refresh rate, and dot pitch are just some of the variables that can make one monitor look different than others. In general, it is not a big deal for displays to look different when they are in different locations, but when you have them side-by-side on your desk it may be more of an issue. If the image quality isn't similar, shifting your eyes back and forth between the two monitors can become a strain as your eyes try to adjust to each. Many quality LCD displays have specifications that overlap and should be comfortable on the eyes, but a nice crisp LCD next to a slightly worn CRT is a different story.

Final Words

Dual display configurations are not difficult to setup and offer an economical alternative to upgrading to a larger monitor. The convenience of such a monitor arrangement can be reaped in both business and personal applications, and once you experience working or playing on two displays, you may wonder why you didn't do it sooner.