



Matrox graphics solutions for control rooms.

GIS ON DISPLAY

HARDWARE DISPLAY TECHNOLOGY ENABLES GREATER PRODUCTIVITY AND DECREASES THE TIME REQUIRED TO COMPLETE TASKS. SAMUEL A. RECINE AND LIV STEWART DISCUSS THE ADVANCES IN GRAPHICS TECHNOLOGY FOR HIGH-RELIABILITY ENVIRONMENTS.

Working with GIS information while confined to a single display is inefficient in many applications of GIS. Even when powered at a high resolution, a single monitor often does not provide enough desktop real estate to best manage the breadth of information contained in or associated with geospatial data. Overlapping windows often hide significant information and a lot of time can be wasted toggling between minimised applications, query windows or data windows.

Technological advances in graphics hardware and software over the past few years have introduced new possibilities for professionals in various industries working with GIS data. A notable technological advancement is the ability to power multiple monitors from a single computer, often known as “multi-display”, “multi-monitor”, or “multi-screen”. With the use of multiple monitors, onscreen information can be easily moved from one display to another as if all the displays in the system are part of one large display. Geotechnology professionals from many industries have adopted the use of multi-display systems as the productivity gains associated with working on more than one display are leading to noticeable results.

Spread it out

The use of multi-display technology allows one to break away from the limitations associated with working on a single display. Similar to how unrolling a map out on a desk rather than looking at a folded map corner enables one to see more information at once and gain a superior sense of scope, the ability to work across multiple displays helps reduce the need for constant scrolling through data and

toggling through application windows. It is also beneficial to be able to view map information at multiple different zoom factors simultaneously on different monitors. With more displays, additional information is available onscreen and this can increase productivity and reduce errors. Productivity can be improved by reducing the amount of time spent getting to information that does not otherwise fit onscreen and errors can be reduced by making it more likely that important information is visible and easily accessible.

Various studies report productivity gains anywhere between 10 to 50% from using multiple displays. Many who use a multi-display system for the first time are reluctant to go back to a single-display system. “For someone close to the technology the question is: why not more?” says a multi-display report by Jon Peddie Research. “The reasons for, and benefits from, multiple displays seem so abundant and obvious; it is almost confusing as to why every system in the world doesn’t have multiple displays.”

The behaviour of applications in multi-monitor systems does not change from single-monitor usage. The only difference is that more resolution is available and is visible through the use of multiple monitors. The mouse seamlessly glides between monitors to interact with applications and it is possible to drag application windows easily between monitors. Microsoft Windows® 2000 and Microsoft operating systems that followed all natively support multiple monitors. This means that in addition to being able to physically connect multiple monitors to a computer, it is also possible to configure different displays at separate resolutions, colour depths, and refresh rates. This enables



Working with geospatial data on a single display can hinder productivity.

mixing the use of a CRT monitor with a newer LCD monitor, for example.

Multi-monitor management software is available to further enhance the experience of using multiple monitors from one system. This includes the ability to control where display dialogue boxes and message boxes appear and how windows are maximised across—or over a portion—of the expanded desktop.

The desktop management software included with certain graphics hardware, such as the PowerDesk software included with Matrox products, provides more advanced ways to benefit from the use of multiple displays. Such features include the ability to zoom into a specific region of a map and have that portion of the map maximised to one of the other displays or to copy information from one display to another fullscreen, which can be useful in a presentation or training application.

Given the reduction in the prices of monitors, the introduction of more space-saving, flat-panel monitors, and more powerful computers, multi-display systems have become even more cost-effective and practical. Industry has continued to evolve multi-display hardware and software options and customers now enjoy the options at their disposal for scaling their multi-monitor usage across all types of systems including laptops, desktops, workstations, and remote computers.

Optimise operator productivity and command centre design efficiency

In some industries, the desktop real estate made available with two displays is not adequate. In high-reliability environments, such as emergency dispatch operation centres, train control centres, transportation management centres, and energy management facilities, it is essential for operators to have simultaneous access to a significant amount of critical information. In these and other applications, it is not uncommon for each operator console to be equipped with four or sometimes even more monitors.

The scalability and interconnectivity of



Matrox Extio F1400 RGU.

graphics hardware provides IT Managers with a high degree of flexibility in supporting advanced multi-monitor configurations. In order to power eight monitors, for example, it is possible to insert two quad-display-capable graphics cards into a computer system.

Management software for advanced configurations is also available. Certain graphics solutions are equipped with software that supports “stretched” and/or “independent” multi-monitor display modes. In “stretched” mode, the operating system recognizes one large display that spans all the monitors physically attached to the system. The graphics management software assumes the responsibility of distributing the information evenly across all the monitors. Some software applications, particularly those using alarm notification windows that pop up before operators, benefit from using this mode. In “Independent” mode, on the other hand, the operating system recognizes each display individually. It is therefore possible to support different resolutions on different monitors.

Free up space at the operator console

In high-reliability environments, the ability to *remotely* power the user interface I/O devices (such as monitors, keyboard, and mouse) from the computer system can be of great interest to control room IT systems managers. The removal of all workstations from under the operators’ desks addresses IT management concerns, such as system security, environmental control, control room noise levels, and operator desk space.

Various extension technologies have been introduced to address this requirement and, recently, Matrox introduced Extio remote graphics unit (RGU) technology. Extio technology takes a unique approach to extending keyboard, video and mouse—they aren’t simply *extended*, but are processed and accelerated locally at the user end, providing crisper image quality and better performance than previous generation KVM extension technologies. Matrox Extio technology works by replacing the graphics accelerator in a computer system with

a PCI or PCI-Express transmitter card that contains a fibre-optic transmitter. By connecting a standard, multi-mode fibre-optic cable into this adapter and the other end to the Extio remote graphics unit, it is possible to separate the user I/O connections from the computer by up to 250 meters. The user I/O connectors present on the Extio include: six USB ports (for USB keyboard, mouse and other devices), four monitor connectors (for support of up to four displays), and audio connectors (for speakers).

Multi-monitor graphics cards and other multi-monitor expansion products are available in multiple system bus form factors, such as AGP, PCI and PCI-Express, as well as in the form of external upgrade products that simply connect to an existing graphics output connector to add additional graphics outputs to support more displays.

The selection of appropriate graphics cards is vital to the smooth operation of mission-critical systems. Some key factors to keep in mind when assessing multi-display graphics hardware include: the multi-display capabilities of the hardware (i.e. does it support the number of displays that need to be run at the appropriate resolution(s) and configuration?); driver certifications for the application(s) that will be run on the target system; the scalability of the solution for possible future upgrades, the life cycle of the manufacturer’s product line (i.e. do their products typically have life cycles long enough to meet your organization’s refresh cycles so that minimal re-validation of graphics hardware has to be conducted), and the accessibility and responsiveness of the manufacturer’s technical support team.

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