



Monitoring the Grid

Northwest Iowa Power Cooperative uses Matrox Extio remote graphics extension technology to solve issues related to their legacy KVM solution.

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Images courtesy of Northwest Iowa Power Cooperative

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— Dennis Hill,
VP Telecommunications Services,
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About Northwest Iowa Power Cooperative

Northwest Iowa Power Cooperative (NIPCO) is a generation and transmission rural electric cooperative supplying power to seven Class A members and 13 Class B members in western Iowa. To control the 850 miles of transmission line in its service territory, NIPCO uses a Supervisory Control and Data Acquisition system (SCADA) manufactured by Open Systems International (OSI), located in Minneapolis, Minnesota.

The control system is comprised of five networked servers and five workstations providing a graphical interface using dual - or in some cases - quad displays. Through a man-machine interface, the SCADA system controls the NIPCO power grid. The servers and workstations are located away from the power dispatching area where the control and monitoring of the power grid actually takes place. The reason for this arrangement is to keep the key components of the SCADA system in a dry, cool, and clean environment.

The Challenge

In the past, standard Keyboard, Video, and Mouse (KVM) extenders provided the link between the workstations in controlled environmental chambers and the dispatching work area. This worked to distance the components, but the KVM extenders were subject to induced magnetic fields and interference regularly. It usually found its way into the shielded and unshielded Category 5 (Cat-5) cables between the KVM extender end units. The source for the interference was found to be from flickering florescent lights; motors starting and stopping; radio frequency interference; lighting dimmer switches; and last but not least, differences in ground rise potential between the two rooms. In such a controlled environment, even small moves of any of the cables under the computer floor could cause the KVM switch to lock up or system instability to occur. If that happened, the KVM switch needed to be reset, or the Cat-5 cable needed to be moved to a different location to minimize the induced electrical noise or interference.

Another issue NIPCO needed to address was the shift in the IT industry away from legacy PS-2 computer interfaces for the mouse and keyboard, in favor of the Universal Serial Bus interface (USB). It was very clear NIPCO needed to replace their legacy setup for remotely interfacing to the workstations' CPUs.



The Solution

In an effort to find a solution to replace this outdated technology and eliminate their interference problems, NIPCO visited DistribuTech, an industry trade show specializing in showcasing the newest technologies for automation and control systems. It was at the Matrox Graphics booth that they found their solution: the [Matrox Extio F1400](#) remote graphics unit (RGU). Extio leverages PCI Express bus extension technology to separate the I/O devices from the computer and drives multiple displays from the monitoring location. With Extio's support for multimode fiber-optic cable, the NIPCO control system would be impervious to the challenges of the "wired" system.

The Result

Once installed and powered up, the Extio F1400 unit worked immediately. The quality of graphics improved considerably on the video displays. Even the projection map board showed marked improvement in resolution and sharpness.

NIPCO's control operators record and chart system power flows on multiple monitors, and one Extio unit per operator system supplied video to all four monitors with superb resolution. An additional benefit of Extio over traditional KVM extension technology was there were now USB ports to support workstation devices, and PC audio at the operator location. The unique part of this solution—it is all over a single non-conductive, multimode fiber-optic cable instead of four or more separate video and workstation cables running from the environmental controlled room to the dispatching center.

With the great success of the Extio rollout in the SCADA system, the cooperative has now decided to incorporate Extio F1400 into their energy management system as well. The energy management system controls appliances such as electric water heaters, air conditioners, and irrigation systems with radio signals which are broadcast to receivers installed on homes and farms in rural western Iowa. This energy management system is leveraged several times monthly when the demand for electricity energy is at its highest. Through this technology, NIPCO is able to defer that load for several hours, reducing the cost of electricity to the end consumer.

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For More Information

The Matrox Extio Series is ideal for environments requiring data security, low heat emissions, no noise, and more workspace. Contact Matrox Graphics to learn more: www.matrox.com/graphics.

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