



THE CIP ADVANTAGE™

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FROM THE EXECUTIVE DIRECTOR

Welcome to this issue of *The CIP Advantage!* It will focus on developments and activities in Asia. This region is “home” to many ODVA vendors of CIP Networks and is a center of manufacturing. The Asian market for CIP Networks continues to evolve, and 2006 will be remembered as a year of important milestones including, but not limited to, the addition of EtherNet/IP and ControlNet to network standards in the People’s Republic of China and the launch of CompoNet—both indicative of the continued expansion and solid investment of CIP Networks. We invite you to read this issue to learn more about developments with CIP Networks and ODVA activities in Asia and the future-proof and proven benefits of choosing networks built on the Common Industrial Protocol.

Katherine Voss

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DeviceNet: Improving Productivity in the Chinese Oil and Gas Industry

When Shanghai Shenkai Science & Technology Engineering Co. Ltd. (Shanghai Shenkai), one of China’s largest research institutes and manufacturers of petroleum prospecting and well-logging instruments, looked to upgrade its well logger product to a next generation control system, it chose DeviceNet™, and DeviceNet-enabled control products. Critical to the success of the logger was a network that provided a robust physical layer that could operate in the extreme environments of oil drilling sites, and network messaging and services that support field operations running 24 hours a day, 7 days a week, even when equipment falters.

Meeting the energy needs of China’s is a top priority for industry in China. The Chinese economy is world’s fourth largest in terms of gross domestic product, and is growing at more than 9 percent per year. Moreover, the Chinese industrial sector uses over half of the energy in east Asia, excluding Japan. Overall China comprises approximately 10% of world energy consumption, projected to approach nearly 15%

by 2025. Today, coal-produced energy accounts for the majority of energy consumed in China, and China’s carbon monoxide emissions have more than doubled since 1980.¹ Collectively, these factors make improvements in oil exploration, drilling and extraction critical to China’s future, and one of its biggest challenges.

Poised to meet this challenge, Shanghai Shenkai is one of China’s leading high-technology enterprises, specializing in instruments used for prospecting for oil, from their research and development to the manufacturing of instrumentation. Its major products are instruments for oil exploration, drilling and extraction including well loggers, blowout preventers, and drilling and extracting tools. Shanghai Shenkai also offers services, in conjunction with its products, to help oil producers with know-how necessary to operate as efficiently as possible.

Continued on page 4

New CIP Networks Solutions From ODVA Members

COMMUNICATIONS ADAPTER

The FnIO-A series is a compact modular with a Network Adaptor and discrete I/O. It has a discrete I/O 32pts, availability to extend S-series and provides various communication interfaces. I/O Module of FnIO-A Series has a screwless, removable T/B to reduce setup and troubleshooting time. It also has a sensor type connector. The FnIO-A series is DeviceNet CONFORMANCE TESTED™.

CREVIS Co., Ltd.
www.crevis.co.kr



I/O MODULES

The BradControl™ Classic 60mm I/O modules for DeviceNet connect industrial controllers to I/O devices in harsh environments. Available in an 8-port 16 channel format with a selection of I/O configurations supporting both PNP and NPN input devices, the Classic 60mm features include settable rotary MAC ID switches, ADR and Quick-Connect support, and ODVA Group 2 Server Slave functionality. The BradControl Classic 60mm I/O modules are DeviceNet CONFORMANCE TESTED™.



Daniel Woodhead Co.
www.woodhead.com/products/automation/ioblocks/activeio/

ACTUATOR

The BIFFI F02 is a compact, intelligent, electric actuator, incorporating as standard all the advanced variables needed to provide effective control. It is available as a direct current or single/three phase actuator for on-off and modulating quarter-turn valves, with integrated technology and economical in power consumption. The F02 is DeviceNet CONFORMANCE TESTED™.

BIFFI Italia
www.biffi.it



MASS FLOW CONTROLLER

Brooks Instrument's SLA7000 MFC Series is a 1-1/8" wide profile, high purity, metal sealed thermal mass flow measurement and control instrument for use in advanced gas handling systems. The SLA7000 MFC Series is DeviceNet CONFORMANCE TESTED™.

Brooks Instrument
www.brooksinstrument.com



TACHOMETER

The SpeedTalker-DN(UI) is a network-powered, DIN-rail mount tachometer which converts pulse frequencies to RPM units. Outputs measure shaft RPMs from 2 isolated universal sensor input channels along with 8 independent configurable under/over threshold alarm states. The SpeedTalker-DN(UI) provides isolated 24Vdc sensor power and measures both speed and direction when used with a quadrature encoder. The SpeedTalker-DN(UI) is DeviceNet CONFORMANCE TESTED™.

Electro-Sensors
www.electro-sensors.com



PNEUMATIC VALVE CONTROL

The CPX terminal with EtherNet/IP (CPX-FB32) provides flexible linkage of pneumatic and electrical control chains to an automation system up to 512 I/O. The terminal has 4 different valve terminal platforms in central and decentral installation, 8 connection techniques, various digital, analog and temperature modules, combined with unique diagnostics features to enhance the application flexibility. Remote control, Web-Monitor and email alarms help reduce engineering costs. The CPX-FB32 is EtherNet/IP CONFORMANCE TESTED™.

Festo AG & Co. KG
www.festo.com



Upcoming ODVA events

For more information or to register for these events, please visit www.odva.org.

SPS/IPC/DRIVES

November 28-30, 2006 • Nuremberg, Germany
ODVA Exhibit: Hall 6, Booth 350

EtherNet/IP PlugFest #6

December 5-7, 2006 • Detmold, Germany

SEMICON Japan

December 6-8, 2006 • Makuhari Messe, Chiba, Japan
ODVA Exhibit: Hall 9, Booth 9B-305

EtherNet/IP: The Proven and Complete Solution for Manufacturing Automation



Free, one-day seminar for users or vendors wishing to learn more about industrial Ethernet. Seminars are scheduled in Milan, Italy and Stuttgart, Germany for Quarter 1 of 2007, with more to come throughout the year. Please visit www.odva.org for the latest list and to register.

CompoNet: A New CIP Network for Simple Sensors and Actuators

Industrial trends towards the increased use of smart, networked devices have delivered corresponding increases in manufacturing efficiency. However, most manufacturing automation applications also rely on vast numbers of much simpler field devices. These simple sensors and actuators exchange small amounts of data and would not benefit from greater intelligence. However, these control devices still need to be integrated with the plant network, but the considerations for doing so are very different, focusing on efficient handling of bit and byte size data, support of hundreds of nodes on a single network, and highly flexible network topology spanning long distances

To meet these requirements, ODVA has introduced CompoNet™. CompoNet provides users with a device-level network of small, high speed I/O nodes with the CIP Network services to connect to the plant and the enterprise. Complementary to the entire family of CIP Networks (DeviceNet™, ControlNet™ and EtherNet/IP™), CompoNet meets the requirements of applications using large numbers of simple sensors and actuators by providing high speed communications, configuration tools, efficient construction, simple set-up and high availability – all on a single network.

CompoNet allows the user, on a single network, to send and receive bit and byte size data, efficiently and rapidly, to and from simple sensors and actuators using implicit (I/O) messaging, and provides the ability to configure

and collect data using explicit messaging. It is firmly focused on high speed communications between a master controller and its connected slaves. Output data for multiple nodes is transmitted from the master in a single data packet. A single master (typically a PLC) controls the network, to which are connected combinations of bit slaves (I/O which transmit simple 2-bit On/Off data) and word slaves (I/O which transmit 16-bit On/Off and analogue information). The network supports a maximum of 256 bit slave I/O (128 input nodes and 128 output nodes) and 128 word slave I/O (64 input nodes and 64 output nodes).

The advanced physical layer minimizes signal degradation and transmission delays while providing the user with a flexible network architecture offering a range of data rates – 4, 3, 1.5 Mbps and 93.75 kbps – and cumulative trunk-line distances up to 1500 meters (93.75 kbps with repeaters and round cable). Further, the use of repeaters dramatically extends cabling distance with no degradation of transmission speed. Up to 64 repeaters can be connected (a maximum of two between the master and any slaves), extending or branching the communication cables and expanding the number of connection nodes. The repeater design introduces almost no latency, and delays which could potentially cause collisions are automatically compensated for within the CompoNet hierarchy. In addition, CompoNet includes an option for power (24V DC, 5A) and signal in the same cable with the ability to remove and replace nodes under power.

Whenever large numbers of sensors and actuators are involved, wiring effort becomes a major cost consideration. CompoNet offers quick and easy installation using cost-effective flat network cable with pressure-clamping IDC connectors (IP20) or round cable (no network power) that allow for flexible cabling topologies including daisy-chain and trunk-line. An optional flat cable-connector system is rated for IP54. For further flexibility, in addition to extending the transmission distance, repeaters can be used where the cable media needs to be changed (from round to flat, or vice-versa) in different parts of the system due to environmental needs.

In its data link layer, CompoNet utilizes Time Division Multiple Access (“TDMA”). This media access control approach is designed to avoid collisions and provide a deterministic network with the ability to update large numbers of nodes at state-of-the-art update rates.

The first edition of the CompoNet Specification was approved by ODVA's Technical Review Board in August 2006 and is scheduled to be published by ODVA in the next publication cycle of the CIP Networks Library and associated network specifications. The next step in creating the open standard for this new network technology is the release of the ODVA Conformance Test for CompoNet devices. ODVA expects to see vendors start offering CompoNet CONFORMANCE TESTED™ products in 2006. ●

ODVA Around the Globe

USCAR SUPPORTS ETHERNET/IP STANDARD FOR PLANT FLOOR APPLICATIONS

The United States Council for Automotive Research (USCAR) has agreed to support EtherNet/IP as the industrial Ethernet network standard for plant floor applications in vehicle assembly facilities. To further this agreement, USCAR is proceeding with specific initiatives to accelerate its adoption in the U.S. vehicle assembly operations of its three member companies – DaimlerChrysler Corporation, Ford Motor Company and General Motors Corporation. In the first of its initiatives directed at EtherNet/IP, USCAR is working with ODVA to identify aspects of network performance that have the most impact on real-time control applications that are typical in vehicle assembly operations and developing reporting criteria for specific network performance parameters. One result

will be that purchasers of EtherNet/IP devices will be able to make better purchase decisions by analyzing published performance parameters for specific devices and choosing the device that best meets the performance requirements of each application. Adjunct to the USCAR agreement, the United States National Institute of Standards and Technology (NIST) and ODVA have entered into a Cooperative Research and Development Agreement (CRADA) to research and develop industry standards and test methodologies for performance parameters of EtherNet/IP devices. The USCAR member companies are expected to require certified performance test reports for EtherNet/IP devices starting in 2007. ODVA anticipates that the US automotive industry will see an increase in the use of EtherNet/IP in PLC-to-PLC

communications and robotics applications such as welding, gluing, nut running and clinching.

NEW SPECIAL INTEREST GROUPS FORMED

ODVA announces that two new joint Special Interest Groups (jSIGs) have been established. The new Automotive Joint Special Interest Group (“Auto jSIG”) seeks to promote ease of use and interoperability of products used by the automotive industry that are based on CIP Network technologies. This new jSIG replaces the previous Automotive SIG to expand the development focus to all CIP Networks technologies. In addition, the new Conformance Test Joint Special Interest Group (“Conformance jSIG”) seeks to promote conformance testing for communication products which implement all network adaptations of the Common Industrial Protocol. This

new jSIG replaces the DeviceNet Conformance SIG and EtherNet/IP Conformance jSIG.

NEW EDITIONS OF THE SPECIFICATIONS PUBLISHED

In April 2006, ODVA published the latest revision to the DeviceNet™, EtherNet/IP, and CIP Safety™ Specifications. The EtherNet/IP Specifications now include the CIP Sync™ extensions and CIP Motion™ Drive Profile, and the CIP Safety Specifications include extensions for EtherNet/IP. In addition, the next revision of the DeviceNet and EtherNet/IP Specifications are now under member review, with an anticipated publication date in 2006. To order a copy of the Specifications, please visit www.odva.org.

TO STAY CURRENT ABOUT ODVA AROUND THE GLOBE

Visit the ODVA web site at www.odva.org.

EtherNet/IP Becomes an Industry Standard in China

EtherNet/IP has been adopted by the National Development and Reform Commission (NDRC) of the People's Republic of China as a machinery industry standard for the People's Republic of China. This adoption will spur continued growth of this open industrial network's installed base – already exceeding 1 million nodes worldwide, and a projected growth in the double digit rates.

EtherNet/IP is one of the network technologies that comprise the family of networks—including DeviceNet, ControlNet and the forthcoming CompoNet— built on the Common Industrial Protocol (CIP™). The machinery industry standard for EtherNet/IP in China is recognized under the Chinese standard JB/T 10308.2-2006: Digital data communication for measurement and control - Fieldbus for use in industrial control systems. ControlNet was also approved by the NDRC as a part of the China machinery industry standard. These two open networking technologies join DeviceNet, the first member of the family of CIP Networks to obtain approval as a standard in China, when the DeviceNet technology was made part of the first Chinese national standard to encompass fieldbus technology – GB/T 18858: “Low Voltage Switchgear and Controlgear Controller-Device Interface.”

Through its rapid adoption worldwide, EtherNet/IP continues its ascent as the developed, proven and complete industrial Ethernet choice. It has been adopted by International Electrotechnical Commission (IEC) and its European equivalent under IEC 61158 “Digital data communications for measurement and control - Fieldbus for use in industrial control systems” (EN 61158) and IEC 61784-1 “Digital data communications for measurement and control – Part 1: Profile sets for continuous and discrete manufacturing relative to fieldbus use in industrial control systems” (EN 61784-1). Synchronization extensions to EtherNet/IP, allowing sub-microsecond clock synchronization using IEC 61588 (IEEE-1588™), have also been approved by the IEC in the publicly available specification PAS 62413. The contents of this PAS are being integrated in the new edition of IEC 61158, as part of the IEC 61784-2 project covering “Additional profiles for ISO/IEC 8802-3 based communications networks in real time applications.” The lower layers of EtherNet/IP are based on the various RFC internet standards and on the ISO Ethernet standards (ISO/IEC 8802-3:1996) with no modification or extension to these widely used industry standards, allowing seamless integration of office and manufacturing networks and information.

“Standard, unmodified Ethernet and Internet technologies will play a critical role in achieving continuous productivity improvement in automation applications and for integrating those applications with the enterprise,” states Katherine Voss, Executive Director of ODVA. “Approval of EtherNet/IP as an industry standard by the People's Republic of China will provide vendors and users with the assurance that an investment in EtherNet/IP will provide positive returns in today's global economy.”

The effective date of the standard is February 1, 2007. ●

DeviceNet: Improving Productivity in China *Continued from page 1*

Shanghai Shenkai looked at many factors and evaluated other networks including H1, a communication network primarily intended for process control, before choosing DeviceNet. They chose DeviceNet because they were able to design a well logger capable of functioning in environmental conditions with high magnetic interference, operating temperatures from -40 to +60 degrees Centigrade, with network messages and services that support fault-tolerant operations to keep the system up and running on a continual basis.

“With the demanding environmental conditions, it was critical to us to choose a solution that provided strong anti-jamming properties in order to meet our customer's requirements for 24/7 operation,” said Min Wang, head of the combination logging unit

project. “DeviceNet's robust physical layer made this possible and was also flexible to meet future needs of our customers.”

Not only did DeviceNet meet Shanghai Shenkai's goals for the product, it also saved them routing and installation time, initially taking only two weeks to commission and install. The DeviceNet-based well logger has been in field installations since 2001, providing the Chinese oil producers with critical instrumentation needed to meet China's increasing energy needs.

¹ <http://www.eia.doe.gov/emeu/cabs/chinaenv.html>



THE CIP ADVANTAGE

THE CIP ADVANTAGE newsletter links you to the latest developments in industrial networking technology and trends. If you wish to receive future issues and are not a current subscriber, you may subscribe online at the ODVA web site at www.odva.org.

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