

Fall 2008

## Modbus Exhibits at ISA EXPO 2008

Visit the Modbus -IDA booth at ISA EXPO 2008 October 14 - 16 in Houston, Texas. Find us at ISA's Bus Station in Booth 1128, along with partner members **3 Notch Industrial Communications, Byres Security, Spectrum Controls, and Schneider Electric.**

Join us for various Modbus presentations in the Bus Station Theater. Scheduled throughout the show, these include:

### **WebPort - Remote Connectivity to Your Automation System** (Spectrum Controls)

Oct 14 5:00 pm & Oct 15 10:30 am

### **Integration of Modbus Devices into CIP** (Modbus-IDA)

Oct 14 3:00 pm & Oct 15 2:30 pm

### **Modbus Security Made Easy** (Byres Security)

Oct 14 2:00 pm & Oct 15 3:30 pm  
(also in the Security Exchange Theater Oct 15 12:00 pm)

We look forward to seeing you there!

Visit Modbus-IDA  
Booth 1128  
ISA EXPO 2008

#### Meet with:

- 3 Notch Industrial Communications
- Byres Security
- Schneider Electric
- Spectrum Controls

## Byres Security Announces First Modbus Firewall

For the first time in the history of industrial automation, a security module designed specifically for managing the leading SCADA protocol, Modbus TCP, is commercially available. Modbus-IDA

member **Byres Security Inc.** and MTL

Instruments, a division of Cooper Crouse-

Hinds, are introducing the Tofino™ Modbus TCP

Enforcer Loadable Security

Module (LSM). The device

performs detailed analysis and

filtering of all Modbus TCP

messages, and is certified by

Modbus-IDA. It allows owners of control and SCADA systems to regulate Modbus network traffic to a level of detail that has never before been possible, thereby increasing network security, reliability and performance of critical systems.

“Deep packet” or “content” inspection for web e-mail or traffic has been offered in IT firewalls for years, but nothing has been available for the process control or SCADA world. Conventional firewall solutions could either allow or block Modbus traffic, but fine-grained control was impossible. Since the smooth flow of Modbus TCP traffic is critical to the average industrial facility, engineers typically opted to let everything pass and take their chances with security.

This spring a major U.S. Government agency warned energy companies about security vulnerabilities, particularly in the firmware upgrade process used in control systems. Two major energy companies have trialled the Tofino™ Modbus TCP Enforcer LSM, which has allowed them to follow the government's guidance and enhance both the security and stability of their systems.

Learn more about the Tofino™ Modbus TCP Enforcer at [www.byressecurity.com](http://www.byressecurity.com).



**Modbus**

## Meet Some of Our Members...

**Sunlux Technologies Ltd.** was incorporated in 1989 and today presents itself as an industrial IT company with activities in the following areas:



- Real-time embedded systems and software development
- Windows system software development
- Industrial networking
- SCADA
- Process/factory automation
- Robotic engineering

Sunlux offers a Modbus Source Code Library for Modbus Master and Slave for Modbus TCP and Modbus over serial line (RS232, RS485 and fiber optic). The company also offers the Protocon Communication Gateway family of products, which enables communication between devices supporting dissimilar communication protocols.

( [www.sunlux-india.com](http://www.sunlux-india.com))

Based in Geisenheim, Germany, **Wachendorff** has been designing, manufacturing and distributing devices for controlling, monitoring and optimizing industrial control equipment for over a quarter-century. The company's major product lines include:

- "OPUS" Control Panels for mobile platforms
- Incremental encoders
- Industrial electronics



With distributors around the world, Wachendorff makes available various Modbus devices, including EWON.

([www.wachendorff.de](http://www.wachendorff.de))

**Softing** is a global provider of hardware and software for industrial automation and automotive electronics.

In industrial automation, Softing is a specialist in fieldbus technology. Softing provides customers the technology to connect devices, controls, and systems with the leading communication technologies.

Softing has a wide range of expertise including OPC, FDT, and Real-Time-Ethernet protocols such as Modbus TCP, PROFINET IO, and EtherNet/IP. In addition, Softing has established itself as a provider of sophisticated diagnostic tools for fieldbus systems.



Based in Haar (near Munich) Germany, Softing has subsidiaries in Düsseldorf and North America.

([www.softing.us](http://www.softing.us))



### Modbus Newsletter

This is the newsletter of Modbus-IDA, the international nonprofit organization devoted to the evolution and support of the Modbus protocols.

For more information about membership and other services of Modbus-IDA, please refer to our website: [www.modbus.org](http://www.modbus.org)

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### The Modbus-IDA Mission

Modbus-IDA is a group of independent users and suppliers of automation devices that seeks to drive the adoption of the Modbus communication protocol suite and the evolution to address architectures for distributed automation systems across multiple market segments. Modbus-IDA will also provide the infrastructure to obtain and share information about the protocols, their application and certification to simplify implementation by users resulting in reduced costs.

# Modbus-IDA

# Organization News • Organization News

Michigan-based **Acromag** is a multi-million dollar international corporation that combines more than 50 years of process monitoring and control experience with a solid background in



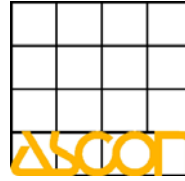
high-tech computer design. Established in 1957, Acromag built its reputation designing critical measurement instrumentation equipment for the petrochemical and aerospace industries.

Today, Acromag's product line encompasses a wide variety of I/O devices for manufacturing, military, scientific, public utility, and transportation applications. For process instrumentation, Acromag's signal conditioning line features more than 100 transmitters, isolators, alarms, and computation modules. If networked I/O is required, Acromag offers analog and discrete I/O modules for Ethernet, Modbus, Profibus, and LonWorks®.

For real-time control systems, Acromag provides a full line of high-performance analog, digital I/O and serial I/O bus boards for VMEbus, PCI, and CompactPCI® computer systems including IndustryPack® and PMC mezzanine modules.

([www.acromag.com](http://www.acromag.com))

Established in 1969 in Europe and 2004 in the United States, **Ascon Corporation** designs and manufactures



control, instrumentation and automation components for the process and manufacturing industries.

Ascon expanded into North America in 2004 as part of a worldwide business plan to offer greater sales and support directly in every major industrial marketplace.

The company's portfolio includes:

- AC Series of multifunction PLCs
- DeltaDue product family of temperature controllers with data acquisition and I/O modules
- Gamma2 family of panel mount universal controllers, set-point programmers-controllers, and indicators

Ascon also offers pressure, level, humidity, and temperature transmitters, temperature, infrared temperature sensors, control valves, rotary/electric actuators, E/P converters, Thyristor power controllers, and single phase solid state relays.

([www.asconcorp.com](http://www.asconcorp.com))

For over twenty years, industrial systems integrators have relied on **Moxa** products in major device networking installations all over the world. Working with a network of distributors, Moxa offers industrial networking products to systems integrators and value-added resellers in over 60 countries.

Moxa's business and environmental practices are backed by ISO 9001:2000 and ISO 140001 certification. Moxa was established in 1987 and has offices in Europe, the United States, China, and Taiwan.



Moxa's MGate™ family includes advanced Modbus gateways that provide flexibility for integrating industrial Modbus networks of all types and sizes.

MGate gateways are designed to integrate Modbus TCP, ASCII, and RTU devices in almost any master and slave combination, including serial master to serial slave, or simultaneous serial and Ethernet masters.

([www.moxa.com](http://www.moxa.com))



# Modbus Discussion

## Q&A

### From the Modbus Discussion Forum...

#### *Data Logger Data to SCADA...*

**In August, Mutt asked:**

How do I get time stamped data from a logger/RTU into my trends on an Intouch or similar SCADA?

**Adriel Michaud replied:**

Depends entirely on the RTU or protocol used. If your HMI does not directly support the RTU or device, you can use an OPC server to access your data. Note that some protocols or devices cannot provide a timestamp, so the timestamp may come from the PC that the OPC server sits on. Ask your OPC vendor.

MatrikonOPC has a wide variety of OPC Servers here: <http://matrikonopc.com/opc-drivers/index.aspx>

**Burnikell added:**

I'd go along with the same philosophy that Adriel suggested. In the past I've used the same approach for getting data out of Chessel chart recorders and Eurotherm RTUs. On these occasions I needed to get the data from the instrument using a plug-in expansion card that allowed connection between the device and a PC using Modbus protocol. On the PC, I installed an OPC server, which then allowed me take the data into other applications (in my case an AspenTech IP.21 historian).

In my case the timestamp could be extracted as part of the data transferred from the recorder/RTU. However, as Adriel states, it is dependent upon what the device allows, and if it doesn't support timestamp then the OPC server can append a timestamp.

Add your advice to this thread, at [modbus.control.com/1026248898](http://modbus.control.com/1026248898).

#### *Modbus Write to Register 40002...*

**Joe Oliphant wrote to the forum:**

I'm working with an old ABB ACS400 variable frequency drive. I'm trying to get it to start from a VB program. This requires setting a value to register 40002 and then writing values to the command word at 40001.

I've written similar programs for Allen Bradley and Altivar drives and both of those have odd quirks where you have to write more than one register at a time or write to a goofy offset.

On the above I've used Modbus TCP, but on this antique, it requires an RS232 and CRC checking.

The ABB drive simply refuses to let me write anything to 40001, 40002, or 40003 but will let me write to any other valid register. Maybe it's something with the CRC. It beats me. I've stumped them at tech support at ABB so if anyone here has any great ideas, I'd appreciate it.

**Lee Clore offered:**

I believe 40002 is mapped to the Control Word Speed (or Torque) reference. You likely can't change it if the drive is enabled. Depending on the operating macro, you will need to verify the enable or run signal is low before the source can be set. If you are using the DDCS Bus (fiber converter), then forget all that—I think that had more to do with it.

**Lee later added:**

Let me clarify that—I think 40002 sets the control word source (ai, comm, keypad, etc.), not the actual reference itself. Something to verify..

**Joe Oliphant got back to the group with new information:**

I found the problem. You have to be connected through the RS485 port. It will let you change every other register through the RS232 port but not the command word at 40001 or the two holding registers 40002 and 40003.

Anyway, I ordered up a RS232 to RS485 converter so I'm "holding" so to say 'til that arrives.

**Mark suggested:**

Download Automated Solutions Modbus Master ActiveX Control. <http://automatedsolutions.com/products/modbusrtu.asp>

Run the pre-built MiniHMI example application and write to the register that you are having trouble with. If there is an issue, MiniHMI will provide a detailed error description that should point you in the right direction.

**Another user supplied an additional resource:**

1. Download the Modbus TCP slave simulator at

<http://www.peakhmi.com/>.

2. Execute your register write to the simulator. This will validate your code. If it does not work post your write command stream, in hex, and I will look at it.

Read more comments or add your advice to this thread, at [modbus.control.com/1026244892](http://modbus.control.com/1026244892).

*Ask a question or help a fellow engineer on the Modbus Discussion Forum: [modbus.control.com](http://modbus.control.com) a syndicated community of [Control.com](http://Control.com)*

# Modbus Products and Innovations

## Phoenix Contact Introduces nanoLine®

nanoLine® is a small programmable controller/relay with Ethernet connectivity, a removable operator display and easy flow chart programming, designed to control small to midsize machines that require few I/O points.



Base controller stations are available in 24 V DC, 24 V AC/DC and 115 V AC versions. The on-board I/O consists of digital inputs and outputs. The nanoLine accommodates up to three I/O expansion modules, bringing the total possible I/O count to 24 digital inputs and 16 digital outputs.

The nanoLine offers a variety of optional expansion modules, increasing its flexibility. Communication modules for Ethernet, RS-232, RS-485 and USB allow easy data exchange with Modbus TCP or Modbus RTU. The optional operator panel can be mounted on the base unit, through a control cabinet or used as a simple hand-held device. Pluggable memory and real-time clock modules are also available.



The nanoLine controller uses nanoNavigator software, an intuitive flow chart language that allows for easy programming and hardware configuration. The user can create the control logic with just six simple instructions. Most programs can execute under one millisecond. nanoNavigator software can be downloaded for free at [www.phoenixcontact.com/nanoLine](http://www.phoenixcontact.com/nanoLine).

## Plant Integration with Mynah's MiMiC Simulation and Virtual IO Module Network Gateway

Mynah Technologies writes a lot about MiMiC Simulation and all that it can do, including its ability to simulate IO over Modbus TCP and integrate to Schneider Unity, PLCs, Citect SCADA, HIMA, DeltaV, and other modern control systems. Rarely does MYNAH mention its Virtual IO Module Network Gateway (VIM), which allows users to integrate plant devices and existing IO over Industrial Ethernet networks quickly and easily. This product makes seamless integration of plant floor devices and modern control systems easy.



VIM provides a native DeltaV IO interface to industrial Ethernet devices using Modbus TCP or Ethernet/IP protocols. MYNAH also has a PLC IO Interface that allows users to migrate existing GE Genius Bus, Modicon S908, and Allen-Bradley 1771 Remote IO to any modern control system.

Key features of the DeltaV Virtual IO Module include:

- **Seamless Integration with DeltaV.** Each Virtual IO Module is seen by the controller as up to four Virtual DeltaV Serial Cards. Commissioned Virtual IO Modules are auto-sensed by DeltaV auto-sense IO function as DeltaV Serial Card(s). Data set configuration is done in the DeltaV Explorer in the same manner as a DeltaV Serial Card. IO signals can be used in DeltaV Control Modules and displayed on DeltaV Operator graphics.
- **Intuitive Network Setup.** Graphical, drag-and-drop functionality makes setting up the plant Ethernet network easy.
- **Powerful Integration Solution.** Each Virtual IO Module can emulate up to four DeltaV serial cards and support up to 128 Serial Card Datasets of information from 32 network addresses. Communication over the plant Ethernet network is fast and efficient. User configurable IP addressing allows the Virtual IO Module to be used in almost any plant environment regardless of network scheme.
- **Modular, Flexible Package.** The DeltaV Virtual IO Module mounts the same way as the DeltaV controller. It uses a DeltaV 2-wide or 4-wide carrier and power supply connect to the DeltaV IO Bus by the carrier side connector.



More information about VIM can be found at [www.mynah.com/vim/vim\\_network\\_faq.asp](http://www.mynah.com/vim/vim_network_faq.asp).

# Modbus Products and Innovations

## Modbus Solutions for the Power Industry

**Kalkitech's** Modbus-to-IEC 61850 protocol converters, gateways and OEM embedded boards enable Modbus device manufacturers and end users to integrate their Modbus networks with IEC 61850 networks seamlessly. The products supporting Modbus and IEC 61850 include small stand-alone converters that can convert Modbus to IEC 61850 and IEC 61850 to Modbus and form a bridge between the Modbus and IEC 61850 networks.

Kalkitech's stand-alone converters support both Modbus TCP and Modbus serial. They enable interconnection or migration from a serial network to a Modbus TCP network as well as IEC 61850.

The OEM modules are designed for Modbus product vendors that face the requirement to support IEC 61850 in products used in electric power and oil and gas industries. Kalkitech's embedded OEM module can be board mounted into existing Modbus products to provide an Ethernet interface with IEC 61850 support. The OEM module is small enough to fit even the smallest device in the field.



Kalkitech's protocol gateways can manage hundreds of thousands of data

points and provide enterprise-level and SCADA center-level data aggregation capabilities on Modbus and IEC 61850. The units are ideal for large systems with many communication interface support requirements, especially in electric sub-stations and select oil and gas projects.

([www.kalkitech.com](http://www.kalkitech.com))

**KALKITECH**

## Moving Cement Making into the Future!

Nesher is Israel's largest cement manufacturer. The company has three plants located in Haifa, Ramle and Bet Shemesh. Recently, it updated the technology used in all plants by moving from outdated wet production lines to more efficient and environmentally safer dry lines.

Nesher Ramle has two dry lines where it manufactures approximately 3.6 million tons of clinker and 5 million tons of cement annually. **Afcon Software and Electronic's** P-CIM 7.02 is the SCADA/HMI running the plant's processes; Afcon's Dart is used for remote control and monitoring.

With approximately 40,000 I/O points, the systems employs Modicon Quantum PLCs and I/O cards and 85 PCs (using Windows 2000).

Using Modbus TCP and Schneider

Electric's ModbusPlus protocols, the system communicates over fiber optics at both the network and I/O levels.

Using P-CIM 7.02 and Dart 3.71, AFCON designed and integrated the new control and management project into Nesher Ramle. This included:

- Design and integration of the control, management and operation networks
- Design and layout of the fiber optic communications network
- Design and supply of the control panels
- Design and integration of all equipment and software in the control room
- Hardware, supply of PLCs, I/Os and communication cards

Dart 3.71 enables sending events, alarms and reports to operator or manager mobile phones.

([www.afcon-inc.com](http://www.afcon-inc.com))



**Nesher Cement Plant, Israel**



**AFCON SOFTWARE AND ELECTRONICS LTD.**

## Advertise Your Modbus Products on the Modbus Website

With our growing number of site visitors and the increasing popularity of our device directory, what better place to advertise your Modbus devices and software than at [www.modbus.org](http://www.modbus.org)?

E-mail [lenore@modbus-ida.org](mailto:lenore@modbus-ida.org) for a rate sheet.

# Join! Design! Test! Promote! Apply!

We're with you. Modbus-IDA exists to help suppliers and users of Modbus protocols succeed. Our members range from suppliers of Modbus-compliant products, to system integrators, end users, and educational institutions.

The common link? They all value the information and services provided by Modbus-IDA, and they all play a role in determining the future of the world's most broadly applied protocol.

**To join Modbus-IDA, order a Toolkit, or arrange conformance testing, visit our website:**

**WWW.  
modbus.org**

## Designing with Modbus

Each day, Modbus developers turn to Modbus-IDA for valued assistance with their projects:

- Start with downloading specifications and other design documents from the modbus-ida.org website.
- To really save time, purchase the Modbus TCP Toolkit CD (FREE with general membership); it contains source code and a myriad of other resources.
- Then, if you come across technical issues that have you stumped, post your question on our active developer's forum. One of the many experienced Modbus implementers who frequent this forum will likely have your answer.

## Conformance Testing

When your project's done, what then? How do you know it really conforms to Modbus specifications? How do your users know?

The answer starts with running the conformance test suite included with your Modbus TCP Toolkit. This self-test helps you check your design assumptions and catch the subtle

"gotchas" that might otherwise slip through your design review.

To make the definitive statement of your company's commitment to open protocols, submit your product for testing to the independent Modbus-IDA Conformance Test Lab. We'll certify your product as compliant, and post that information on the Modbus website for the world to see.

## Visibility for You and Your Products

Your products, your membership in Modbus-IDA also opens the door to a powerful range of visibility options to highlight your company as a supplier of Modbus-based products.

Exposure on our website, in our newsletter, and through our various trade show appearances are all options that allow you to make the most of your Modbus-IDA membership.

If your company is truly on the cutting edge of new technology, you'll likely also value the opportunity to participate in our technical committees. There, your company's knowledge, experience and technology can help guide future enhancements, extensions and adaptations of Modbus to keep it the world's leader for decades to come.

## Time to Apply

When it comes time to get your Modbus network up and running, it's comforting to know that hundreds of thousands of applications have preceded yours. But what if things don't go as planned?

The modbus-ida.org users forum is ready to answer your questions and provide guidance. Thousands of users from diverse backgrounds read the forum, giving you a powerful base of experience from which to draw.

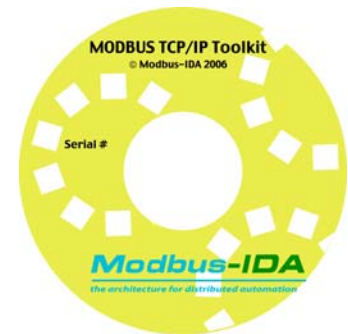
## The Future is Yours

So, whatever your role in the use of Modbus, consider joining Modbus-IDA. You'll get the support you need today, and have opportunities to help guide Modbus to a dynamic future.

## The Modbus TCP Toolkit

The Modbus TCP Toolkit provides all the necessary pieces to develop a Modbus-compliant device, including documentation, diagnostic tools, sample source code, and pre-test software to prepare for Modbus-IDA conformance certification. The toolkit is available as a benefit of membership in Modbus-IDA or can be purchased separately for US\$500 plus shipping and handling.

### Toolkit Contents



### Modbus Documentation

- Modbus Application Protocol Specification, V 1.01b
- Modbus Messaging on TCP Implementation Guide, Rev. 1.0b

### Tools

- Modbus/TCP Client Diagnostic Tool
- Modbus/TCP Server Diagnostic Tool

### Sample Source Code

- Modbus/TCP Sample Client Code for Visual Basic Win32
- Modbus/TCP Sample Client Code for C/C++ Win32
- Modbus/TCP Sample Server Code for C/C++ Win32
- Modbus/TCP Sample Server Code for C VxWorks
- Modbus/TCP Sample Server Code for C++ VxWorks

### Conformance Testing

- Modbus/TCP Conformance Test Software