Modbus-IDA News

Modbus Is Everywhere... at Hannover Fair

Learn more about Modbus from Modbus-IDA and member companies at Hannover Fair. With a focus on Modbus in wireless applications, we are joined in the Modbus-IDA booth (Hall 9, Stand A59) by member companies **Afcon Software & Electronics**, **Moxa Networking**, and **Schneider Electric**, with appearances by **ACT'L**, **connectBlue**, and **Hirschmann Electronics**.

You will also find many other Modbus-IDA members exhibiting at the show. For your convenience, here are locations of member companies in other halls throughout the extensive fairgrounds:

- **ACT'L (eWON)**: Hall 9, Stand A66
- **Afcon Software and Electronics**: Hall 9, Stand A59
- **connectBlue**: Hall 16, Stand E62
- **Hilscher**: Hall 11, Stand B68
- **Hirschmann Electronics**: Hall 9, Stand F28
- **HMS Industrial Networks**: Hall 11, Stand E64
- **IMI Norgren**: Hall 13, Stand E60
- **MESCO Engineering**: Hall 11, Stand A41
- **Moxa Networking Company**: Hall 9, Stand C46
- **Phoenix Contact**: Hall 9, Stand G40
- **ProSoft Technology**: Hall 7, Stand A46
- **Schneider Electric**: Hall 11, Stand C29

A map of the fairgrounds can be found on the web at: www.hannovermesse.de/21997.

We look forward to sharing information about the ubiquitous Modbus protocol, answering technical questions, and telling you about our testing program, developer's toolkit, and membership.

See you at the fair!

Moxa Announces MGate Family of Ethernet Gateways

Taiwan-based **Moxa Technologies Co., Ltd.** has developed a new family of products to connect Fieldbus devices to Ethernet. The first product is MB3000, the Modbus gateway.

In addition to standard features such as multi-client and multi-request capabilities, the MB3000 series has the ability to detect response timeouts — one of the most difficult settings for Modbus users to accommodate in configuring their devices. Moxa predicts a savings of more than 70 percent of configuration time because of this feature.

MGate Ethernet Gateways require only five steps for configuration and come with multi-language support including Chinese, English, German, Japanese, Russian, and Spanish. A comprehensive troubleshooting and trace tool assists with traffic analysis, and smart routing allows users to expand nodes using a Moxa high-density gateway without changing existing devices.

Priority control assures that emergency commands are delivered in real time for time-sensitive applications.

Learn more about the MGate product family at www.moxa.com/product/MGate_MB3000_Series.htm.

MGate MB3180

Meet Some of Our Members...

Odenberg Inc. is an international group with over thirty years experience in the food processing industry. The company has concentrated its research and engineering resources on developing and manufacturing special types of equipment to meet the specific requirements of the food industry.

Odenberg has operating facilities in North America, Italy, Holland and Ireland. Through its specialized divisions, the group designs, manufactures and markets peeling, sorting and freezing and chilling solutions for the food processing industry.

The world's only "total peeling system" company, Odenberg has been involved in the design of steam peeling for over 30 years. During that time the company has supplied over 500 units worldwide.

By focusing on peeling as a process, Odenberg has helped its customers ensure long life and minimum equipment maintenance. Visit Odenberg's website to learn more about its expertise in other areas such as sorting machines and solutions and industrial blast freezing and chiller equipment.

(www.odenberg.com)

Dataforth is a world leader in data acquisition, signal conditioning and data communication products for industrial applications. Worldwide, its products provide rugged signal and data integrity and wide spectrum accuracy.

As Dataforth is fond of pointing out, faulty thousand-dollar data acquisition systems can shut down billion-dollar operations.

Dataforth's isoLynx® SLX200 is a fast, intelligent, fully isolated data acquisition system providing reliability, accuracy, and isolation for a wide range of rugged industrial applications. It offers flexibility of analog and digital I/O selection for a broad range of factory automation, process control, test and measurement, machine control, and data acquisition applications.

The isoLynx® SLX200 implements standard Modbus RTU and Modbus TCP protocols, enabling communication with a wide variety of third-party software drivers and HMI/SCADA packages. The product has been certified by Modbus-IDA.

(www.dataforth.com)

MESCO Engineering is one of Modbus-IDA's systems integrator members. The company provides a complete range of product development services from requirement specification to prototyping in process automation, factory automation, and building automation.

MESCO develops various types of products, including devices for measuring physical units, industrial communication devices, explosion-proof devices, and Ethernet/Internet/embedded webserver applications.

MESCO Engineering also offers its Modbus-TCP Hardware Interface, which implements the Ethernet physical layer and data link layer in accordance with the Ethernet II 802.3/IEEE 802.2 standard.

The interface is capable of operating with both 10Base-T and 100Base-TX systems. It also provides a microcontroller-based hardware platform for implementing TCP/IP and Modbus mapping on TCP/IP protocols. The device is contained on a double-sided printed circuit board 40 mm x 40 mm and can be used to implement Modbus TCP or any number of services built on TCP/IP or Ethernet.

(www.mesco.de)

Become a Member

see back cover for details...

Q&A

From the Modbus Discussion Forum…

Modbus TCP with PHP...

In November, Fabou3377 posted this question:

I need to find a resource to interface php with Modbus TCP. Does anybody know of a resource?

Roy Yin suggested his own program:

I have a program called Modserver on Linux (Fedora, Suse). It is very reliable.

The whole system structure:

PHP

|

Modservre

|

SCADA, PLC

www.icscada.ca

Michael Griffin had an add-on question:

I had a look at your web site as I was curious, and noticed your mention of "XML Modbus protocol," "XML Modbus command," and "XML Modbus message." Is this just your way of describing an implementation of a set of web services, or is there actually some formal "XML Modbus" standard that I haven't heard of?

Roy Yin replied:

Modserver is a service program, just like OPC server. To control a RTU, C, PHP, or any script language connect to Modserver by using TCP socket or Unix Socket, and send XML format command to Modserver. Modserver parses the XML command, optimizes,

creates a RTU acceptable Modbus command, and sends to RTU. It will format the response from RTU to readable XML format, and send back.

To write 25.4 register 40179 on server 15

<modbus tranid="1"

unitid="15"

address="40179"

number="2"

function="16"

datatype="float"

byteorder="DCBA"

data="25.4" />

and response:

<modbus tranid="1" function="16" data="" state="0" />

Michael Griffin also offered:

There are free Modbus TCP drivers available. I will let others recommend particular libraries, but you can perhaps use the ones from pvbrowser (http://pvbrowser.de) or MAT (http://sourceforge.net/projects/mat/).

In either case, you will end up with a C library that you need to interface to PHP. Below are some URLs which show how to do this in the general case.

- www.php.net/manual/en/zend.creating.php

- www.zend.com/php/internals/index.php

Yan Seiner suggested:

I've got a fairly generic Modbus library written in C for linux at:

www.seiner.com/ts7000/index.php/Modbus_and_Serial_Comm

It's GPL, so please read and understand the benefits and restrictions that places on the code use. I am working on a TCP wrapper now. If anyone would like to contribute, please feel free.

Mostly it needs testing and debugging.

Modbus Communication Time...

In March, Ric Carreras wrote to the forum:

I need to know the total execution time for a system using Modbus at 9600 Baud and four nodes. For each node I am communicating with 3 diffent bits, and 6 Data Registers.

Can you give me the execution time for 9600 and 19200 baud?

Jerry responded:

Each modbus RTU request would be 8 bytes. At 9600 baud this would take less than 0.009 seconds. A 6-register response would be 17 bytes and 0.018s. Increasing the speed to 19200 baud would cut the transmission times to about half.

The time the server takes to generate the responses would be far greater than the actual time to send it.

With a short delay between messages (less than one second) I would expect these short responses from 4 nodes to take 5-10 seconds. The baud rate wouldn't make a noticeable difference.

Ask your question or help out a fellow engineer on the Modbus Discussion Forum:

modbus.control.com

Read Modbus-IDA President, Fred Cohn's article *Modbus, Real Time, Determinism and Reality in Plant Floor Control* in the Industrial Ethernet Book:

http://ethernet.industrial-networking.com/articles/articledisplay.asp?id=1672

Control Tech. Announces BlueFusion™ 5300 Controller

Control Technology Corporation has added the Model 5300 to its Blue Fusion™ line of web-enabled controllers. The Model 5300 features the following enhancements:

• **Web-enabled features.** The Model 5300 supports CTC's patented web server technology. Users can monitor and control process variables securely over intranets or the Internet using a standard web browser. Using CTC's webHMI software, customers can create graphical HMI projects that can be hosted on the 5300's web server giving any browser-based device interactive HMI functionality.

• **Modular architecture.** The Model 5300 series lets users optimize the controller configuration for each application. Choose from multiple CPUs and a wide array of I/O and motion modules to build a system.

• **Ethernet QuickLink (EQL) Remote I/O.** For applications that require distributed I/O, the 5300 supports CTC's EQL high-speed remote I/O. EQL nodes can be located up to 100 meters apart.

• **Rugged Industrial Design.** All-metal design makes the 5300 ideal for harsh environments that experience extreme operating temperatures, shock, and vibration.

• **Industry Leading I/O density.** I/O modules are available in 4, 8, 16, and 32 channel versions and feature pluggable terminal blocks for direct wiring.

• **Dual CPU technology.** A second CPU processor can be added for increased performance or redundancy.

• **Removable Flash Disk.** CPUs can be equipped with a Secure Digital flash drive providing up to 2 GB of storage for data-logging, large CT webHMI projects, and system files.

Modbus Support

Blue Fusion controllers support the Modbus protocol on the serial and Ethernet ports. Designers can use Modbus to connect Blue Fusion to thousands of third party devices and computer systems. The device supports Client/Server TCP and RTU, Client/Server Serial RTU/ASCII. The Model 5300 can also be used as a converter to translate between different Modbus formats.

BlueFusion™ Model 5300

MatrikonOPC Releases Modbus OPC Server 4.2

MatrikonOPC is proud to announce the release of the new MatrikonOPC Server for Modbus Version 4.2. The new release culminates four years of testing, evaluating, and improving one of the company's most solidly performing OPC Servers.

MatrikonOPC developers paid tremendous attention to comments and requests from users of the MatrikonOPC Server. Upgrades to the product responded to customer requests such as improved performance for bound checking. A sleek new graphical interface completes the package.

BATman Reincarnated...

Hirschmann Electronics recently announced its new BAT54-Rail wireless device. Because wireless solutions offer such great flexibility, they can be used in mixed mobile and fixed networks. The BAT54-Rail is an ideal solution wherever users need high bandwidth, stable operation and network security.

The BAT54-Rail is a dualband access point/access client with WLAN ports that support IEEE 802.11b/g and IEEE 802.11a/h communications. Windows- or web-based configuration wizards speed up and simplify installation and setup.

BAT54-Rail Wireless Device

The hardware is built to withstand the rigors of industrial applications and offers redundancy, reliable data transmission, excellent WLAN quality, and network security based on authentication, encryption and a firewall.

Features include:

• Rugged IP 40 metal case
• Redundant power supply
• Two high-speed dual wireless IEEE 802.11b/g and IEEE 802.11a/h LAN ports
• Redundant WLAN links for reliable data transfer
• Up to 108 MBPS per radio module
• IEEE 802.11i high-security point-to-point transmission
• RS-232 serial port for configuration and remote access
• Faster roaming and prioritizing, 802.1 x authentication
• TelNet interface and SNMP-based management

For more information visit Hirschmann's web page: www.hirschmannunlimited.com.

Matrikon Modbus OPC Server 4.2

Key Features of Version 4.2:

- Proven reliable OPC technology, with customer-driven refinements
- Modbus-to-OPC connectivity to all Modbus-IDA compliant devices
- Easily combines with other OPC plug-and-play products, such as calculation engines and data historians

MatrikonOPC

- Extremely small footprint on your existing system architecture
- Robust enough to be combined with the MatrikonOPC Data Calculator to form a virtual PLC

More information about MatrikonOPC Server for Modbus (Plant Edition), as well as a free download, can be found on the MatrikonOPC website at www.matrikonopc.com/opc-drivers/1603/index.aspx.

Get Your Ticket at the Station...

Modbus-IDA will exhibit at ISA EXPO 2007 in the show's new Bus Station. The pavilion is designed exclusively for fieldbus organizations

**Modbus at the Bus Station
ISA EXPO 2007
October 2 - 4
Houston, Texas**

and their members to display fieldbus devices, and discuss innovations and industry trends.

Modbus-IDA invites show vistors to pick up a Modbus Ticket with a schedule of presentations and stops at member company booths.

Several prize drawings for iPods and one grand prize drawing for a laptop computer are planned as part of the program. Come to the Bus Station and visit the Modbus-IDA booth and member companies at the show!

Modbus Device Directory Update

With almost 600 Modbus devices listed, the Modbus-IDA Modbus Device Directory is the place to go to find the appropriate Modbus product for almost any application.

Both Modbus serial and Modbus TCP devices are included in the searchable database. The device pages are the third most popular pages visited on the Modbus website (following downloads from the Modbus protocol specification pages).

Modbus-IDA plans to continue growing the database to assist users in locating devices. Directory listings include easy-to-access technical specifications and product photos and descriptions. Potential users can easily learn about their options and make comparisons.

Check out the Modbus Device Directory at www.modbus.org/devices.php. To list a device, e-mail info@modbus-ida.org.

ISA EXPO 2007

Advertise Your Modbus Products on the Modbus-IDA 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?

All banner ads must conform to the following specifications:

- File size: 20k maximum
- Maximum dimensions: 468 pixels x 68 pixels
- File type: Graphics Interchange Format (GIF) or animated GIF
- Resolution: 72 dpi
- Color depth: 8 bit (256 colors)
- Every banner must include a working URL.

Please note that we will not post ads. with cycle rates or animation modes that are irritants to our visitors. We would be happy to help you design an effective Web ad with acceptable cycle rates and types of animation.

Contact lenore@modbus-ida.org for a rate sheet.

Modbus Makes the Water Flow in Iraq

By Danetta Bramhall

In Badaah, Iraq, David Watts adds finishing touches to his work in the Nasiriyah Water Treatment Plant — his home away from home for nearly eight weeks. The largest water treatment facility in Southern Iraq, the Nasiriyah Plant supplies 10,000 cubic meters per hour of fresh drinking water to approximately three million Iraqis in Ad-Dawayah, Badaah, Al-Shatra, Al-Garaaf, Nasiriyah and Sug Ash Shuyuk.

"This new water facility rivals any state-of-the-art water treatment plant we have in the States," said Watts.

It didn't start out that way.

Watts sat in his home office in Krum, Texas when he recently received an e-mail from a friend asking if he would be interested in going to Iraq to program PLCs (Programmable Logic Controllers). The equipment had already been ordered and shipped to

the facility, but they had no one in the area who knew how to program PLCs. David Watts owns DWC Technology, and is primarily involved in systems integration and consulting for automation projects.

"I thought about it for awhile," said Watts. "Then my daughter said, 'Wouldn't it be awesome to go and help build this plant and be a part of history?'" His wife and three children all agreed that traveling to Iraq and helping build community infrastructure would be a great experience. So he packed his bags.

When Watts arrived in Iraq, he discovered Allen-Bradley PLCs with about 10 percent of their programming completed. A Modicon Quantum PLC was roughly 80 percent ready. He immediately set to work.

Individual ControlLogix processors were placed at three pump stations

The Garaaf River lies east of the Flocculation Clarifier.

along the Garaaf River, a small branch of the Tigris River. The fourth ControlLogix was placed in the control room to function as a SCADA host for the plant. The Quantum PLC, which has 20 Remote I/O drops, was used to control the backwash of 20 individual filter cells.

"Then came the problem of getting the Quantum PLC to communicate with the ControlLogix," said Watts. "I had never used a **ProSoft Technology** interface module before. There were no manuals or cables on location to help me with this, so I called ProSoft Tech Support."

ProSoft Technical Support Engineer, Scott Lee, answered the call. "You could tell right away that he had his hands full," said Lee. "But he obviously knew how to program and only needed a little nudge in the right direction to get the ProSoft Modbus Interface module up and running."

The Nasiriyah Water Plant is located just north of Nasiriyah City, between the Tigris and Euphrates Rivers. This is the area commonly referred to as the "Fertile Cresent," a rich food-growing area.

The plant takes water from the Garaaf

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.

River and delivers the water into 10 large clarifiers to allow the sediment to settle. Alum is then mixed with the water to allow remaining particles to coagulate prior to sending the water to the flocculators. Next, the partially cleaned water is sent to sand filters where a majority of the bacteria is removed. Finally, chlorine is added to kill any remaining bacteria, and the water is sent to two underground storage tanks.

Nabeel Abbood.

"Nabeel was hired to handle the IT at the plant," said Watts. "But he has also received a crash course in PLC programming and integration and has been a great help to me. When I leave he will be the person with the most PLC programming experience at the plant."

The new plant replaces a small water plant that was severely overtaxed.

Workers were given an award for 4.5 million safe man-hours.

"If we have to go outside the camp, Kroll, a company from the UK, provides security. For that we had to wear body armor and travel in bullet-proof Suburbans."

Watts' next stop is home to Texas, but he says the experience has been such a good one he plans to return to Iraq to help with the Erbil Water Plant located in northern Iraq. Work is near completion on a $100-million water project that could bring 6000 cubic meters of clean drinking water to the people of Erbil every hour starting next year. The project, which will be built in multiple phases, includes a potable water treatment plant, an intermediate booster station, and a storage tank and pipeline.

Danetta Bramhall is staff writer at ProSoft Technology.

Fluor-AMEC, the project contractor, awarded ANCo and Snaffee, both Iraqi contractors building the plant, a safety award for 4.5 million safe man-hours.

"That award was really something," said Watts. "When you consider we had as many as 1000 workers at a time building this plant, the pump stations as well as the pipeline that measures one meter in diameter. The local workers are also a big reason why the building of this plant has been so successful. It has created jobs and has become a source of pride for southern Iraq."

One of the Iraqis who has been instrumental in the programming and commissioning phase, and will continue to be once the plant is operational, is

"This is a very agricultural area," said Watts. "Except for a small water treatment facility nearby, some of the people in the region get water in buckets from the river, so this is going to be a great improvement for them."

When asked if he had to take any special precautions on this job, Watts laughed. "Only when going outside the compound."

A private security detail from the United Kingdom and General Saad, the top-ranked Iraqi officer in the province, provided troops for the safety of the workers traveling in the region.

"General Saad came to the plant personally," said Watts. "He was an incredibly nice guy. After he shook my hand he then touched his heart, which is a way of showing respect here."

ProSoft Technology's MV156-MCM was integral to the Nasiriyah Water Treatment Plant project.

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, educational institutions, and even individuals.

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-ida.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 (hint: it's FREE with membership), which 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 highly 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.

But 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-IDA website for the world to see.

Visibility for You and Your Products

And, speaking of the world seeing your products, your membership in Modbus-IDA 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 CD

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.
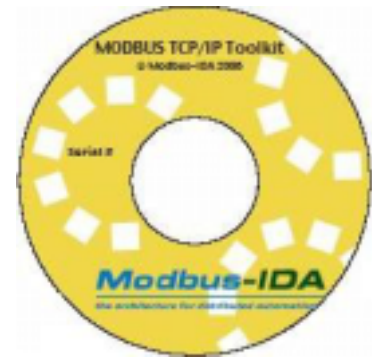
Toolkit Contents

Modbus Documentation

• Modbus Application Protocol Specification, V 1.01a

• Modbus Messaging on TCP Implementation Guide, Rev. 1.0a

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