

Modbus-IDA News

the architecture for distributed automation

November/December 2008

Modbus Members Exhibit at SPS/IPC Drives 2008

Many Modbus Organization member companies are exhibiting this week at the SPS/IPC/Drives Show in Nuremberg. Need a device that "speaks" Modbus or advice on a Modbus issue? Experts at these firms are available to help.

A list of these companies and the halls in which they can be found follows:

- | | |
|-----------------------------------|----------------|
| • AFCON Software & Electronics | 7A-631, 6-244 |
| • connectBlue | 9-225, 4A-542 |
| • Control Techniques | 1-440, 6-208 |
| • Danfoss | 1-358, 6-210 |
| • Hilscher | 6-328, 6-110, |
| • Hirschmann Automation & Control | 10-230, 4A-520 |
| • HMS Industrial Networks | 6-410, 6-208 |
| • INGETEAM | 2-231 |
| • Kepware Technologies | 6-244 |
| • MatrikonOPC | 6-244 |
| • MESCO Engineering | 6-210 |
| • MOXA | 9-221, 9-125 |
| • Phoenix Contact | 9-339, 6-110 |
| • ProSoft Technology | 10-240 |
| • Schneider Electric | 6-124, 6-324 |
| • SOFTING | 7-130, 6-210 |
| • Wachendorff Automation | 8-520 |



Modbus Conformance Test Program Update

The true benefit of any open standard is the assurance it provides to users that the products they buy will interoperate seamlessly. Unfortunately, any specification, no matter how carefully written, is subject to interpretation and occasional misunderstanding. That's where conformance testing becomes valuable.

The Modbus Conformance Testing Program provides independent verification that a broad array of qualifications has been met in compliance with Modbus specifications. It provides end users with the comfort that their design and configuration process will proceed smoothly and assures suppliers that their products were developed in accordance with key Modbus criteria.

The Modbus-IDA Conformance Test Committee been working on a revision of the test specification and test suite.

A new test tool is expected to be announced and in operation after the first of the year. At present, conformance testing can be ordered through Modbus-IDA with testing performed by approved third-party test laboratories in the United States and China.

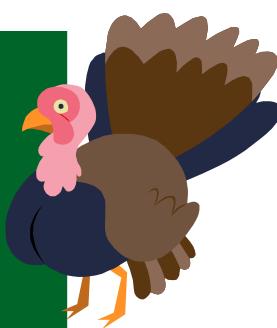
Request a conformance test order form by e-mailing test@modbus-ida.org.

PHP Library for Modbus UDP Master

A new project on the Modbus Organization's Technical Resource page (www.modbus.org/tech.php) is an implementation of the basic functionality of Modbus UDP using PHP. Implemented features include a UDP Modbus client and Function Codes 3, 16, and 23.

Note that the Modbus.org site offers links to third-party sites for Modbus users' and developers' convenience. These are not under the control of Modbus-IDA and we are not responsible for the contents of any linked site or any changes or updates to such sites. The inclusion of these links does not imply endorsement of the site by Modbus-IDA or imply approval of any content, recommendation or application.

In anticipation of the Thanksgiving Holiday celebrated in the U.S. this Thursday, thank you to our member companies for your support and good work!



News about the World's Most Popular Industrial Protocol

Organization News • Organization News

Meet Some of Our Members...

Control Solutions, Inc., has been developing networked control products since 1995, specializing in building automation, facility management, and commercial automation. The company offers a line of off-the-shelf embedded control products with Modbus, BACnet, LonWorks®, and SNMP connectivity.



CONTROL SOLUTIONS, INC.

Control Solutions also provides custom programming for standard hardware and customized hardware solutions. Control Solutions engineers each have over 20 years of experience in embedded controls technology. All products are designed and made in the USA and manufactured under ISO-9000:2000.

Control Solution's Modbus products include the i.Board®, a low-cost web server for Modbus TCP as well as the i.CanDoIt® web server series, which includes Modbus support with a powerful set of features, including data logging, scheduling, alarm monitoring, and e-mail notifications.

(www.csimn.com)

FieldServer

Technologies

designs and markets a broad line of devices

that enhance communication between instruments, systems, machines and other devices that use non-compatible data protocols. The FieldServer combined with its extensive driver library allows users to achieve interoperability.

Drivers included in the library are Modbus, LonWorks®, BACnet, Metasys, DH+, Profibus, and drivers for fire alarm panels, controllers, and many other devices. The primary purpose of FieldServer products is to allow communications over Ethernet with delivery to client devices in a format that is immediately useful to the client device. Ethernet drivers include Modbus TCP, BACnet Ethernet, EtherNet/IP, BACnet IP, Allen Bradley CSP, and more.

FieldServer products meet the interoperability needs of facilities managers and process control engineers in industrial plants and commercial buildings around the world.

(www.fieldserver.com)



Byres Security Inc. develops industrial security technologies for critical infrastructure companies in the oil and gas, power, chemical and manufacturing sectors. Its sister company, Byres Research Inc. is a consulting and services company providing security guidance on cyber protection for critical infrastructures and industrial processes to government security agencies, major oil companies, and power utilities. In October, the company introduced the Tofino™ Modbus TCP Enforcer Loadable Security Module (LSM), the first



security module designed specifically for managing the leading SCADA protocol, Modbus TCP. The device performs detailed analysis and filtering of all Modbus TCP messages, and is certified by Modbus-IDA.

(www.tofinosecurity.com)



Shouldn't your company be a member?

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

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Modbus-IDA

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.

Member News • MemberNews

Afcon Announces Next-Gen SCADA/HMI

AFCON Software and Electronics is revealing the next generation of SCADA/HMI software – Pulse SCADA/HMI – this week at the SPS/IPC/Drives Show in Nuremberg, Germany.

Pulse is the most recent evolution of AFCON's P-CIM solutions for SCADA/HMI. Pulse is designed for the .Net framework. With increased efficiency, superior visualization capabilities, and a highly reliable platform for production, it raises the standard of SCADA solutions for organizations of any size.

Pulse is a SCADA/HMI application generator software that enables application engineers to work in a unified environment regardless of the project deployment nature. It fits standalone stations, networked applications, Web architecture and terminal service deployments, and is also ready to run as client from flash disk. The integrated development environment supports the transportability of application over any .Net compatible platform such as Windows XP/Vista and Server 2003/2008 operating systems.

The Pulse Service-oriented Architecture (SOA) is based on Microsoft's WCF technology, allowing remote distributed

concurrent engineering. Pulse relies on the Microsoft ClickOnce solution to enable remote client workstations to update automatically with new product versions and application definitions.

Taking advantage of .NET technology, Pulse is integrated with a new look and feel and various functionalities that help

Pulse is the most recent evolution of AFCON's P-CIM solutions for SCADA/HMI. Pulse is designed for the .Net framework...

application engineers reduce design time and lower total cost of ownership. With Pulse's new features, users can develop professional visualization screens using global smart graphic objects, layers, themes and styles.

Pulse leverages .Net technology capabilities by granting advanced users the option to extend the collection of functionalities with software components they develop themselves. Components such as activities, engineering unit conversions, .Net

controls and more can be added to the product tools galleries and be reused in the application.

To simplify connectivity from the plant floor to corporate business systems Pulse supports Microsoft SQL Server 2005 and OLEDB compatible databases. Pulse operators and managers benefit from the new integrated Smart Information Panel tool that provides out-of-the-box, real-time, historical and alarm information of any application tag, ready for further data analysis.

Pulse supports over 200 protocols for almost any device on the market, including Modbus TCP and Modbus over serial line, as well as the Unity platform.

Founded in 1987, AFCON Software and Electronics Ltd. is an international software company and a leading provider of SCADA/HMI systems and solutions ranging from industry control and building automation management to OEM applications. (www.afcon-inc.com)



Modbus Discussion

Q&A

Sensors with Modbus TCP...

Emin Ceyhan requested advice about sensors with Modbus TCP:
We need to use a sensor that supports Modbus TCP. We have an RF Reader Controller. The brand is Reva. One of this electronic device's features is support of the Modbus TCP protocol. If there is a sensor or transmitter with Modbus TCP support, the sensor's message can be sent to Reva easily. Any ideas?

M. Griffin responded:

There are lots of "sensors" that work with Modbus TCP. Unfortunately, you are a bit vague as to what sort of sensor you are looking for. If you are looking for an RF antenna, then I would suggest that you talk to the people you bought the controller from. Even if they don't sell one themselves, they can no doubt recommend one to you....

Emin Ceyhan provided more information about his project:

Thank you for the response. I understand you, but we have ... to use a sensor with Modbus TCP support. It is a load-cell. So I need a transmitter with Modbus TCP support.

M. Griffin replied:

So if I understand you correctly, the "sensor" you are looking for has nothing to do with the RF system itself. You are looking for a load cell signal conditioner with a Modbus TCP interface.

I have seen "weigh controllers" with network interfaces, including Modbus TCP. For example Hardy Instruments sells one.

I haven't seen just a plain load cell signal conditioner with any sort of network interface. However, you can use a standard load cell signal conditioner that has an analogue output and connect it to a network module that takes an analogue input.

For example, Acromag has the 851T

From the Modbus Discussion Forum...

Strain Gauge/Load Cell Input, which would interface to the load cell and provide an analogue output.

They also have the 961EN/962EN six-channel differential input: DC current or DC voltage signals or the 963EN/964EN 12-channel single-ended input: DC current or DC voltage signals.

Either of these would take an analogue input from the load cell signal conditioner and output Modbus TCP.

I'm not recommending any of the above products in particular, but I am offering them as examples. There are no doubt equivalents from other manufacturers as well.

pvbrowser offered additional suggestions:

I would suggest a Modbus TCP RS485 gateway such as [the Modbus Data Gateway, ADAM-4572] <http://www.ucs.co.uk/index.php?pid=948> and ADAM modules on RS485 as I/O devices.

Add your advice to this thread at modbus.control.com/thread/1223963647.

Modbus TCP Data Concentrator...

Syed Hussain wrote to the forum:

We are using Honeywell Experion C300 controllers to interface with VSD drives for our expansion project. We would be installing around 200 VSDs all supporting Modbus TCP/IP protocol. The Honeywell Experion C300 controller can now talk peer to peer with the Modbus TCP/IP servers. The only issue is that the controller can only have eight Modbus TCP/IP clients talking to eight Modbus TCP/IP servers. We are looking for a device that can sit in the middle, acting as a client for multiple VSDs and server for the Experion controller. Can someone please advise if such a device is available preferably Modbus-IDA tested?

Mark suggested:

While it has never been tested with 200 devices, the PeakHMI RLL program has Modbus TCP client and server included. It does not have a limit on the number of connections. At the moment it is free: <http://www.hmisys.com>.

Michael Griffin offered:

I have a Free Software (GPL) project called MBServer that can do this. It is available at: http://sourceforge.net/project/showfiles.php?group_id=228414&package_id=276643.

You will also find a link to it from the Modbus.org web site (Technical Resources page).

You would use the mbserver (release 2) package. There is introductory web-based documentation at <http://mblogic.sourceforge.net/>

The package itself has more detailed web-based documentation available through a built-in web server that is accessible when you install it. I will be adding the content of those additional pages to the Sourceforge web site within the next couple of days, so you will be able to read them without installing MBServer.

The software runs on a PC. There are no limits to the number of client connections, but if you have a lot of connections and are polling at a fast rate you will want a fast PC to handle the communications load. Check the CPU load on your PC as you add connections. If need be, you could split the load between several PCs. The software itself won't cost you anything, so it's just a matter of how many PCs you want to set up.

The size of the messages themselves is relatively unimportant. What matters is how many messages per second are being sent and received. This means the load on the server portion of

Modbus Discussion

From the Modbus Discussion Forum, continued...

the software will be relatively unimportant, as you will be reading and writing fewer larger messages.

If you want to load test the PC, there is another package at the same location called mbasyncserver that can be used to act as just a server (or you could just set up a second instance of MBServer with no clients active). Set up MBServer on one PC, and mbasyncserver on another.

Then set the MBServer configuration to open up 200 connections to mbasyncserver and do the same polling commands you would use for the drives. The reason for using two different PCs is so that the second server isn't adding its processing load to the same PC.

If you are interested and have further questions, let me know and I will be happy to answer them.

Syed Hussain responded:

I am more interested in a standalone industrial grade device, preferably din-rail mounted that can act as a server. We do not want to have all 200 devices on the same server; 10 to 15 devices per server would be preferred to reduce the risk of a single point failure.

Can you recommend a device that can serve this purpose?

From Michael Griffin:

I think what you mean is you want an "out-of-the-box" solution. You could run MBServer on an industrial PC, and it would be industrial grade (including solid state drive, if you want).

As for an out-of-the-box solution, I don't know of a system that is exactly what you want. You may want to consider using some small PLCs as data concentrators. Quite a few

support Modbus TCP with client and server modules. You would have to program the communications for them, however, so it isn't entirely out-of-the-box either. Whether you are configuring MBServer or programming a PLC, I don't see how you could avoid telling a system what addresses to read from what drives.

I would be careful about loading any system (including the Honeywell) to its rated limit though. Often, the limit on the number of connections allowed is a crude form of load limiting. The processors in many PLCs (and other proprietary controllers) are relatively slow, and they can get bogged down with communications quite easily. Whether or not this would be a problem for you depends on how fast you are polling.

Typically it is more efficient to transfer one large message than several small ones. I would suggest trying to group the messages from different drives close together in the memory of each data concentrator so you can read them all with one function call from the Honeywell.

Robert Willis suggested:

It would be beneficial to know the manufacturer of the VSD you are

utilizing. With Schneider Electric Altivar 61 and 71 drives it is possible to use the I/O Scanner functionality of the various Modicon PLCs to accomplish the task you are looking to do. The DCS could then communicate to the PLC and control the drives as required.

Syed Hussain:

Thanks Fellows,

We will be interfacing ABB LV and AB MV VSD drives with the Experion C300 controllers.

I have found information on an off-the-shelf ABB LV VSD module called NETA module that can talk Modbus TCP and can connect up to nine drives on an ABB proprietary protocol called DDCS, which is what we are considering.

So the DCS would be talking to the NETA card and NETA would be talking to nine drives using DDCS protocol on a fiber optic ring or star fiber optic topology.

Does anyone have any idea about the DDCS protocol? I could not find any decent documentation on the Net.

We are still looking for a solution for the Allen-Bradley MV VSDs, we are considering an option like ControlNet and then probably a ControlNet to Modbus TCP gateway. Any thoughts on that? Any thoughts on a solution that does not involve a PLC in the middle would be appreciated.

Add your advice to this thread, at modbus.control.com/thread/1026249633.

Modbus users and suppliers get together on the Modbus Community for:

- **Interactivity**
 - **Knowledge aggregation**
 - **Contact with Modbus users and suppliers**
- Discussion supported by...**

control.com®

Modbus Products and Innovations

Modbus Used in Roadside Emergency Phone Monitoring System

Modbus member company **Korenix Technologies**' JetCon 6350 Smart Ethernet I/O Converter was chosen as the control unit for roadside emergency telephones. Designed for use on public highways or private toll roads, the system can service remote areas where cellular systems are not commercially feasible. The phones are connected to the service center by twisted-pair cables. What the customer wanted was to monitor each booth so engineers could immediately know if a booth was in use, in need of service, or being tampered with.

Emergency phones are designed to provide quick and reliable hands-free communication over the public switched telephone network. These emergency phones were located at specific intervals along the highway. All booths were connected to an Ethernet network running the length of the highway.

The JetCon 6350 provided simple local device control for the alarm light, which is automatically activated when the emergency push button is pressed. A door sensor and tilt sensor were also connected, so the JetCon 6350 could provide instant system notification when the door was opened or the booth was being tampered with. Finally, the JetCon 6350 was connected to a power reset switch for the entire booth, so the booth could be restarted by remote or local command if equipment required service.

Major features of JetCon 6350 include:

- 12-channel digital input plus 4-channel digital output
- Multi-form peer-to-peer, point-to-point, point-to-multiple point modes

- Smart logic rules
- Supports event Counter and pulse output mode
- Industrial Modbus TCP protocol
- Windows utility and web display
- Built-in watchdog function
- Safe mode operation
- Din-rail mount
- Robust aluminum case
- IP31 protection



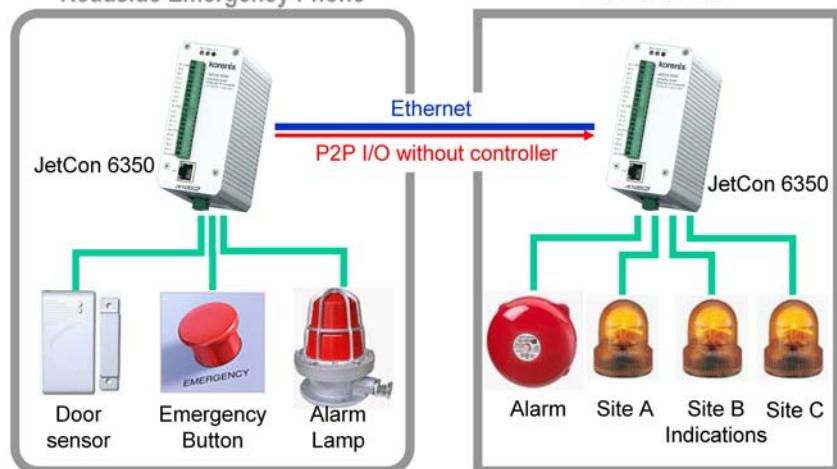
Korenix Technology is committed to designing and manufacturing industrial communications products that can be used in markets that require high stability or for industrial field environments, such as POS, banking, telecom, transportation, industrial automation, energy, power, military, and medical fields. (www.korenix.com).



Roadside Emergency Phone



Traffic Center



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? E-mail 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.

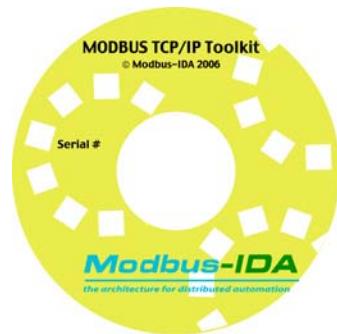
The Future is Yours

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