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Modbus Conformance Certified...

The true benefit of any open standard is the assurance it provides to users that the products they buy will interoperate seamlessly. 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 Organization recently certified the **Magnetrol Eclipse Model 706**, a smart level transmitter operating on the principle of Guided Wave Radar. The Model 706 can be used in many level measurement and control applications, including those containing visible vapors, or media with varying dielectric constant or specific gravity.



Eclipse Model 706

It can be used to detect overall level or interface level, and includes a 30-point custom strapping table for volumetric and flow applications.

The Modbus Organization also recently certified **HMS Industrial Networks' CompactCom M40** Ethernet Modbus-TCP (PN AB6603-B), a complete communication module that enables products to communicate on a Modbus TCP network.



CompactCom M40

The CompactCom family of products offers multi-network connectivity with a single development project, limiting users' development efforts to a minimum.

[Request more information](#) about the organization's Conformance Test Program.

New in 2015

We launch the year's first newsletter with a new design. The newsletter has been dormant for a while as we determined the best way to present updates in the Modbus world: yours and ours.

Count on the Modbus.org web page to bring you the latest news and updates on product releases, updates and resources every day.



New Members...

Pegasus Automation International LLC (PAI) specializes in designing and manufacturing building control systems. PAI has a full range of control products, including software, controllers, sensors, and actuators, which are sold worldwide and designed to offer complete solutions to the building controls industry.

Years of experience, innovative ideas, quality production facilities and concrete services make PAI a leader in the build-

ing control industry, and a member of both BACnet and the Modbus Organization.

PAI has over 20 international distributors and partners throughout America, Europe, Australia, the Middle East and Asia.

Among its offerings are the Pegasus GCU, a complete network gateway with built-in I/O, alarm, time scheduling, and trending; Pegasus EC, a programmable controller, able to work standalone or connect

with a larger network; and the Pegasus Smart Sensor, a networked sensor including temperature, humidity, CO, CO2, pressure, and more.



The Kübler Group is a specialist in the fields of position and motion sensors, counting and process technology and transmission technology.

Among Kübler's 2014/2015

Opto 22 manufactures controllers, I/O, solid-state relays, and software products that link electrical, mechanical, and electronic devices to networks and computers.

The company's latest product, *groov*, makes it easy to build mobile operator interfaces to virtually any system, with no programming.

product releases are the Sendix F58 Modbus encoder family and the Codix 560 - now available with RS232/RS485 interface supports for Modbus RTU and the CR/LF protocol.



Opto 22 recently released *groov* 2.3, a major update, adding Modbus TCP communication to the company's *groov* web-based mobile interface software.

As a Modbus TCP master, *groov* communicates directly with Modbus TCP slave

Joining the Modbus Organization is easy and affordable. Download the membership application to learn more.

devices over standard, non-proprietary Ethernet networks. Opto 22 was founded in 1974 by engineers who designed a better solid-state relay and chose to build it in a non-corporate, flat organization. Over 40 years later, Opto 22 is still privately held, and run by engineers.

OPTO 22

Monitoring Industrial Processes with Mobile Devices

CEOs and chief engineers need to keep a hand on the pulse of their enterprises — to know at any moment how their industrial processes are going. And it's crucially important to be instantly informed, if anything goes wrong.

How best to accomplish this?

iRidium mobile, software designed to control automation systems from tablets and smart phones (for iOS, Android, OS X, Windows 7/8), offers a flexible solution to this problem.

Tablets and smart phones with iRidium's App, i2Next., can:

- display the current state of industrial processes;
- control Modbus systems via a local net or the Internet;
- notify about emergencies in production.

Configuration in iRidium's GUI editor is well adapted for Modbus integrators. Projects require minimal manual setup, and iRidium offers a variety of ready interfaces, with many graphical items for a wide range of purposes, e.g., buttons, sliders, triggers. Each of these

can be modified to suit the needs of a particular project, or users can create new items in the iRidium GUI Editor.

In 2013 Endress+Hauser used iRidium in a project as mobile SCADA for a tank gauging system in reservoir parks. Endress+Hauser is a world leader in measurement equipment, services and solutions for industrial process engineering. The company specializes in optimizing technological processes for economic efficiency, safety and environmental impact.

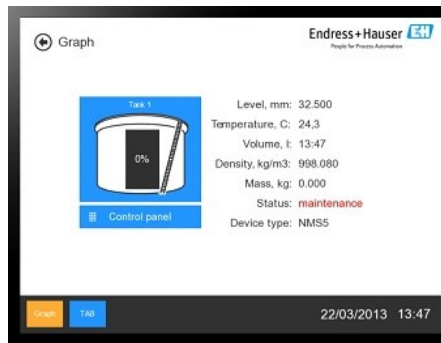
Data were received from TankVision controllers using Modbus TCP and displayed on the screen of a tablet in iRidium's Metro GUI. Interface. Endress+Hauser used iRidium to:

1. Monitor the state of reservoirs (oil level, oil mass, oil temperature and oil density),
2. Notify reservoir park operators about emergencies, and
3. Demonstrate capabilities of the tank gauging system to potential

customers when visiting their offices by means of built-in video broadcast.



Evgeniy Korzhakov, project department head at Endress+Hauser Ltd., explained their choice of software, "Using iRidium turned out to be an interesting solution for customers, as well as employees of our company. On the whole iRidium makes it possible to receive data from and control (if this function is available) any field gadgets, such as pressure



iPad tablet displays data from E+H's TankVision controller using iRidium mobile software.

sensors, temperature sensors, valves, pumps, etc."

iRidium mobile can be used in industrial, commercial and home automation projects. Learn more about [iRidium for Modbus](#).

Q&A from the Modbus Discussion Forum

How to Format Correct Modbus Address...

Hosein asked how to enter the address in HEX for a Delta PID temperature controller (model number: DT48): Temperature controller from Delta company included the Modbus address as follows: 1000H for the process value.

David_2 replied:

In Modscan32, you can select whether the register/addresses display in decimal or hexadecimal under Setup > Display Options > Hex addresses.

I always use decimal addressing, but I have a vague recollection that hex addressing starts at 0001h in Modscan, so you might have to add one

to the hex value shown in the Delta register table in order to address the correct register in the Delta.

For instance, Delta's 1000h might be 1001h in Modscan, not 1000h

Use the data display (Setup > Display options > show data) unless you like the torrent of hexadecimal traffic flooding the screen.

continued, page 4

Modbus Discussion Forum, cont'd

The Delta's serial comm settings have to match the comm settings in Modscan. I think Modscan defaults to RTU, but ASCII can be selected (connection > connect > advanced?)

W.L. Mostia added:

1000Hex = 4096 decimal

See the following link:

<http://www.binaryhexconverter.com/hex-to-decimal-converter> for a converter of Hex to Decimal or vice versa.

You can set the data format in Modscan32. Please see the Modscan32 manual.

Also you may have to take into account that there may be an address offset of 1 in some implementations of Modbus, e.g. Master sent address of 4096 may be register 4097 in the slave?

Any information is provided on Caveat Emptor basis.

[Read more or add your comments](#) to this thread.

Are These Valid Modbus Addresses?

Geoffrybrown inquired: When polling a Modbus TCP Temperature probe from my SCADA system, the manufacturer uses addresses 49 and 50 for Temp and RH [sic]. They don't seem to be valid Modbus read registers in my mind.

Lynn August Linse offered:

You'll perhaps get a lot of answers, but true Modbus numbers registers from 0 to 65535, and coils also are 0 to 65535.

The 4x/0X stuff is a notation used by early Modicon programming tool, where 0 was reserved for none/nop and the address was strictly 0001 to 9999. So 4x0001

was register offset 0, and 0x0001 would be coil offset 0. Eventually, when 64K memory became cheaper than 4x, they bumped this up to 5 digits, but it is still a Modicon notation. You'll find, as example, that SE now use the %MWO for memory-word instead.

My suggestion to vendors is always just include two columns in the document, so your two registers would be 49 or 4x00050, plus 50 or 4x00051. This makes everyone happy.

Fred Loveless located the vendor's documentation:

My colleagues and I did some research based on the model and found the manufacturer's documentation.

It clearly indicates that a holding register read is used and that simply lists the register offsets.

The only thing that could be an issue is if they are doing 0 or 1 based addressing for the registers. Most devices use 1 base, which means that if the master server or SCADA asks for '40001' then the request sent to the device is for register 0. For 0 base addressing '40001' would be register 1. Sometimes devices will only allow you to read one register at a time as well. If you try to read multiple registers at one time you will get errors.

[Read more or add your comments](#) to this thread.

Modbus Device Gateway: Master or Slave...

Christoff DB asked the forum:

We are asked to add a modbus gateway feature to a dedicated device gateway we have. What would a Modbus user/engineer expect?

Lynn August Linse responded:

At a minimum, I would suggest this:

1) all data available as 4x/holding registers, read by function 3. Any bits get packed into 16-bit regs (be aware of how byte-swapping is a bit unexpected for this). If you allow writing, then add both function 6 and 16. As some masters cannot use function 6 - they will instead use function 16 with count of 1.

2) Optionally, you can offer bits up as 0x/coils, read by function 1.

3) Modbus doesn't have an effective (or I should say commonly supported) masked bit write, so if you want bits written, add support for functions 5 and 15.

4) I'd avoid putting anything unique in 1x/3x inputs, as some common masters can't access those.

5) In summary, I'd say there is nothing worse than some piddly little device which puts:

- 7 bits in 0x/coils
- 3 bits in 1x/input status
- 15 words in 4x/holding regs
- 6 words in 3x/input regs

Here every master has to issue four distinct requests to read almost no data. I am not saying you cannot support memory other than 4x/holding regs, only that the best thing you can do for your customers is make sure all data can be read from a single function 3 call. In the example above, Modbus RTU can read all data in one read of 23 words.

[Read more or add your comments](#) to this thread.

The Modbus Community

- Technical discussions
- Knowledge aggregation
- Contact with Modbus users

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 control.com®



Modbus Organization, Inc.

5 Cedar St
PO Box 628
Hopkinton, MA 01748
USA

E-mail: info@modbus.org
Phone: +1 508-435-7170
Fax: +1 508-435-7172

www.modbus.org

The Modbus Organization Mission

The Modbus Organization, Inc. 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 Organization also provides the infrastructure to obtain and share information about the protocols, their application, and certification to simplify implementation by users resulting in reduced costs.

Modbus Resources

Modbus Q&A...

The Modbus Community is the premier on-line engineering discussion forum. Sponsored by the Modbus Organization and supported by Control.com, check out Q&A from the [Modbus Community](#) website or log-in and have the threads you want emailed directly to you.

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Modbus conformance certification...

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Looking for the Modbus specifications and implementation guides?

The Modbus specifications and guides for implementing Modbus over serial line or Modbus TCP can be downloaded freely from the Modbus.org [Technical Resources page](#).

Order the Modbus TCP Developer Toolkit

The Modbus TCP Toolkit provides all the necessary pieces to develop a Modbus TCP/IP-compliant device, including documentation, diagnostic tools, sample source code, and pre-test software to prepare for Modbus conformance certification.

[Learn more...](#)

