

A Proposal: Economical Sub-Metering of Itron/Actaris Water and Natural Gas Meters Within Commercial, Industrial, & Military Facilities Using a Non-Proprietary SCADA Network

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Background

Within a growing segment of commercial, industrial, and military facilities, there exists a compelling need for a combination of both industrial control *and* monitoring of the organization's utility infrastructure, which may include electricity, potable & hot water, natural gas, and wastewater.

In such instances, an industrial SCADA (Supervisory Control And Data Acquisition) system provides an optimized framework for both supervision *and* control – offering mechanisms for realtime monitoring, archival and trending of historical data, supervisory control, and alarming.

As an outgrowth of open industrial communication protocols and standards, a wide range of controllers, sensors, and intelligent devices from multiple, competing manufacturers may be successfully interconnected – provided that each adheres to published, non-proprietary communication standards.

For serial-based SCADA systems, Modbus/RTU and DF1 are two of the most widely-used communication standards; and for Ethernet-based systems, Modbus/TCP and EtherNet/IP are two of the most prevalent.

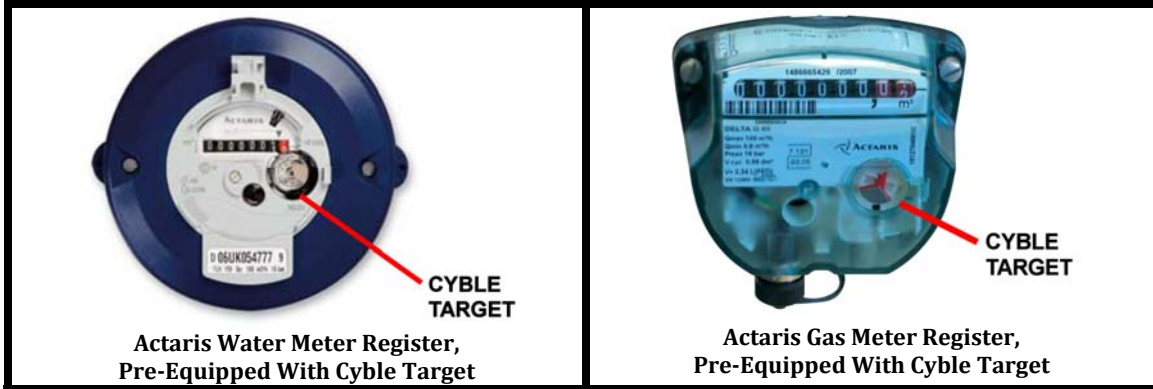
At the central computer – the heart of any SCADA network – graphical HMI (Human Machine Interface) software, communication drivers, and database software tie together all the remote devices within the network. When a SCADA network is based upon standard, non-proprietary industrial communication protocols, then central computer software from many competing vendors can be used to supervise the network with generally similar success. Most importantly, a change in the central computer software to that of an alternate vendor does not necessitate the expense of replacing the remote controllers, sensors, and other intelligent devices.

Water and Natural Gas Sub-Metering Within a SCADA Network

Within the framework of the afore-described SCADA network, this paper shall propose an economical method of monitoring totalization and flow from Itron/Actaris C&I (Commercial & Industrial) water and natural gas meters using non-proprietary, industrial communication protocols.

The Itron/Actaris “Cyble Target” and the “Cyble Coder”

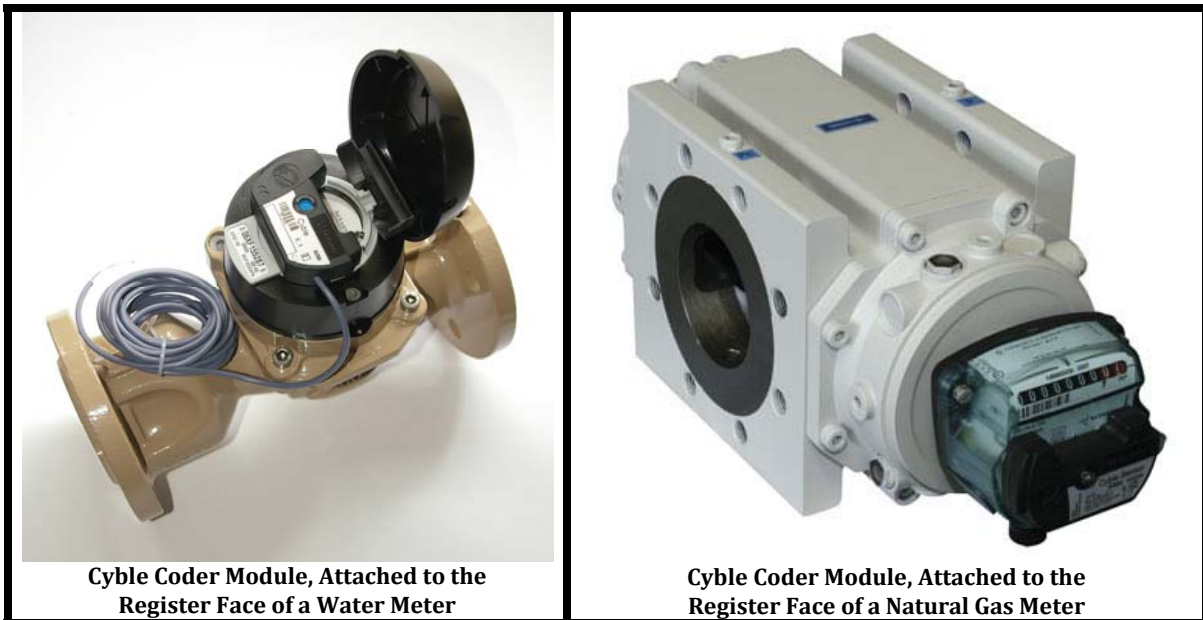
A core feature of Itron/Actaris’ water and gas meters is a rotating, electro-mechanical coupling wheel – the “Cyble Target” – that is housed under the glass of each meter register. The Cyble Target provides a unified AMR (Automatic Meter Reading) interface to the Actaris line of water and gas meters; and a utility may easily attach an encoder-based, radio-based, or pulse-based AMR endpoint to any Cyble-equipped meter.



For connection to third-party AMR endpoints, the “Cyble Coder” is the preferred transmitter, as it provides billable-accuracy totalization and the ability to detect and quantify reverse flows. Additionally, it relieves the endpoint from pulse-counting responsibilities/errors, and it transmits its readings to the endpoint using a meter-industry communication standard, commonly known as the “Sensus AMR Protocol” or “UI-1203 Protocol”.



The Actaris Cyble Coder Module



“Sensus AMR Protocol” (UI-1203)

The Sensus Protocol was proposed by Sensus Metering Systems as an industry-standard communication method for transmitting meter readings to an AMR system. This protocol has been widely adopted by the majority of US-based water meter manufacturers, and as a result provides a common electronic language for communicating with meters that are sold by competing vendors.

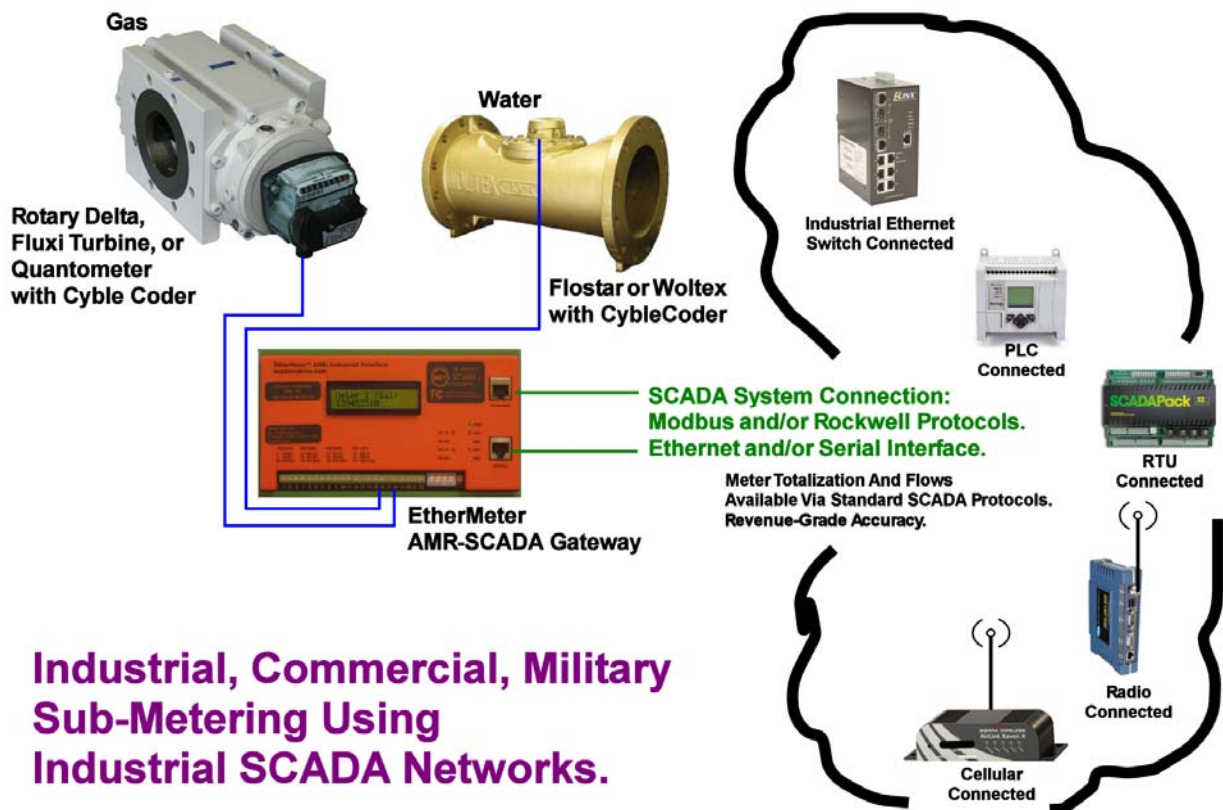
Water meter manufacturers who utilize the Sensus protocol (and related variants such as the Neptune and K-Frame protocols) include ABB, Actaris, Badger, Elster-AMCO, Hersey, Invensys, Itron, Kent, Master-Meter, Metron-Farnier, Neptune, Rockwell, Schlumberger, Sensus, Siemens, Sitrans, and likely others.

Because Itron/Actaris has also pre-equipped its gas meters with the Cyble Target, Sensus Protocol support is provided as well, by extension. Therefore, by virtue of a uniform AMR interface, its water and gas meters can be easily integrated into a SCADA system using a single AMR/SCADA Gateway.

AMR/SCADA Gateway – EtherMeter™

The EtherMeter SCADA/Meter Gateway by SCADAmetrics is a protocol translator that was designed to allow industrial SCADA systems and controllers to read revenue-grade totalization and flow rate from meters. The EtherMeter performs its function by reading meter(s) using the Sensus Protocol, and transmitting the meter data back to a SCADA system using standard industrial protocols such as Modbus, DF1, and EtherNet/IP.

Each EtherMeter features two meter input channels, and therefore a single unit can collect data simultaneously from both a water meter and a gas meter. The dual-meter capability is especially beneficial in many commercial/industrial/military sub-metering applications, as the water and gas meters are often installed in pairs and in close proximity (eg. one water and one gas meter per building at the utility service entrance):



Conclusions

With the increasing prevalence of industrial SCADA systems within Commercial, Industrial, and Military facilities, the requirement to monitor water and natural gas meter totalization and flow using industry-standard SCADA communication protocols is rapidly becoming a necessity.

This paper demonstrated that – when the EtherMeter SCADA/Meter Gateway is coupled with Sensus-protocol water and gas meters – the result is a unified meter interface that adheres to industry-standard SCADA communication protocols. Crucial to the accomplishment of the goals set forth were the existence of the EtherMeter SCADA/Meter Gateway and Itron/Actaris' strategic integration of Cyble technology across both its C&I water and gas meter lines.