H2O Degree has many different methods for reading and writing Modbus data. This overview discusses the three basic methods to access Modbus data.

Access Modbus Data Using an H2O Degree Radio as a Modbus Master

In this application, the H2O Degree radio has an RS-485 serial port that can communicate using a two conductor cable with one or more devices that support Modbus RS-485 RTU. One example would be the H2O Degree model M54550, which is designed to poll one or more EM-2000 electric meters. The EM-2000 has a ModBus RTU bi-directional serial interface. In addition to reading just a single submetering value such as kilowatt-hours, the radio can also read other ModBus registers.

Access Modbus Data Using an H2O Degree Gateway as a Modbus Master.

In this application, the H2O Degree gateway has an Ethernet port connected to the local area network (LAN). Also on the LAN is a third-party wireless gateway which can read proprietary electric meters wirelessly. The third-party buffers the kilowatt hour readings from the wireless electric meters. The H2O Degree gateway connects to the third-party gateway over the Ethernet LAN. The H2O Degree acts as a Modbus master and uses Modbus TCP/IP to read the data packets that arrive over the third-party wireless network to the third-party gateway. Typically the H2O Degree gateway reads data from the third-party gateway every 2 seconds and then sends the data to the H2O Degree server. Each electric meter has a unique serial number, and this number is passed along with the data to identify which device provided the data. The database on the H2O Degree server maintains a correlation between each unique address and the apartment associated with this particular electric meter. The H2O Degree radio can interface to other third-party devices that support Modbus serial RTU. Contact the factory for a quote on custom devices.

Access Data Collected by the H2O Degree Gateway (The H2O Degree Gateway Acts as a Slave)

In this application, the H2O Degree gateway exposes all of the data collected from the wireless network and from any Modbus slaves on the LAN to one or more Modbus masters. The H2O Degree gateway uses Modbus RTU over Ethernet. Since different wireless networks have different Modbus maps, the user is required to run a report that automatically creates a Modbus register map. The Modbus register assigns a unique register address for each data point that the gateway collects from the wireless network. The H2O Degree server automatically downloads the configuration file to the gateway so that the gateway knows the Modbus register to data point assignment.

Typically, the Modbus master is a Building Automation component such as a Jace or Tridium box. The output of the Modbus register map program is a spreadsheet that can be used to configure the Building Automation component. Alternately, the user can log into the web server on the gateway to inspect the Modbus registers and data values as a web page. The Building Automation System can only read most of the Modbus registers. The Building Automation System can write to other registers. One example of write registers would be thermostat heating and cooling set-points.

Diagram 3: Sample Modbus Register Map

Short Explanation of this Modbus Register Map

This property has two water meters, two BTU meters and the gateway.

Each water meter has 15 registers that describe the data coming from the water meter. The base address 11081 is for the first-floor water meter. The base address 11096 represents the second-floor water meter. Some of the registers for the water meter include gallons, temperature, events and flow time.

Each BTU meter has 21 registers that describe the data coming from the BTU meter. The base address 164 is for the second-floor BTU meter. Some of the registers for the BTU meter include gallons, pulses, inlet temperature, outlet temperature, temperature difference and therms.

Finally, the gateway has 12 registers based on address 51. The Modbus register map documentation describes all of the registers for each device type.

Diagram 4: Sample Modbus System Configuration Diagram