

Systems Associates, Incorporated

ControlIQ Building Automation Solutions
SynergyMMS Maintenance Management Software



Interface: Modbus Driver for ControlIQ
Version: 2.12 (revision history listed at the end of this document)
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Interface Specifications

1. Intellectual Property:

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2. Purpose:

It is desired to interface ControlIQ to ModBus for the purpose of monitoring and control of devices that support this open protocol.

3. Sponsoring Property:

The interface is being developed as an overall product enhancement and is not for any specific property. Certain manufactures definitions have been added to support specific hardware at certain properties.

4. SAI Associated Products:

☒ ControlIQ version 2.12.0.0
☐ SynergyMMS version _____

5. General Description of the Interface:

The interface is developed using standard Serial Port communications or TCP socket messaging.

6. Supporting Documents:

This interface was developed based on publicly available documentation. Manufacturer specific documents were used where applicable.

7. Interface Specifics:

- The interface uses standard serial communications (settable)
- The Interface uses TCP sockets (settable)
- The interface was developed via Visual Studio 2005 named Driver_ModBus"

8. Subsystem Table Fields

SubsystemType = Modbus
Settings = [IPAddress of NIC card]:[Port used]
192.168.2.1:TCP4003
[CommPortName:baud,parity,databits,stopbits]
COM1:9600,N,8,1

Personality (tags shown with their default values)
RefreshInterval=0 How often to rescan devices (in Seconds)
QuietTime=60 Delay between TX and RX attempts (in ms)
WaitForAnswer=500 ms to wait for response after TX
WriteAlways Force a write (TX) even if data has not changed
ReverseDOs Specific to mfg=WRTU. This will reverse the outputs
Values for Digital Outputs (i.e On=Off Off=On)

9. Point Types Support in ControllQ

All
Points addressing is defined as
Manufacturer.SlaveAddress.Register
For example: **[ABB.]12.107**
IF the Manufacturer is omitted 'RAW' is assumed

10. Manufactures

The manufacture identifications assists in streamlining the users defining of the devices. This generally defined of the registers are 0 or 1 based and how to translate the TX / RX data based on the register number. For example

ABB.12.103

Defines the ABB VFD Drive at slave address 12 parameter 103 which reads the speed of the drive in hertz * 10 (453 is 45.3 hertz). ABB is a '1s' based register, so the actual register that is reads is 40102.

This could also be addressed as

RAW.12.40016 with the Points.Conversion field having '0.1'

If the 'Ten Thousands' is left off the register, it is assume to be 40,000. i.e 107 is assumed to be 40107 (or 40106 if the manufacture is 1s based). Reading any other register requires the full 5 digits of the register.

RAW.17.00001

Will read or write to the first "Coil" in the Modbus device while

RAW.17.1

Will read or write to the first "Holding Register" (40001) in the Modbus device

Specifics to the Manufactures

Note: all values are read without conversion unless stated

RAW – Read / Write any register,
0s based addressing
No automatic conversion of the data

ABB – Variable Frequency Drives
All registers are in the 40000 group.
1s based addressing
The Register is based on the Group and Parameter. Group 50 parameter 3 is register 5003. Group 1 parameter 7 is register 107 etc
Conversions

Registers 103 to 109, 111,112,116,118,119,122 to 127,
1202 to 1208, 1303,1306, 1504 to 1506, 2003, 2103, 2106, 3010, 3011,
3102, 3103, 4001 to 4004, 4013 to 4015, 4020, 4101 ro 4104,
4113 to 4115, 4120, 5003, 8103 to 8116, 8118, 8119, 9906, 9909
Value * .1

Registers 110,145
Converts Centigrade to Fahrenheit

Registers 9910, 136, 4017, 4117, 8122, 9910
Value * .01

Consult the drive manual for more documentation and engineering units

To send control the drive directly from Control IQ:
Set register 1103 to "COMM" (on the drive's keypad)
Register 1 is the Start Stop Set h47E to stop / h47F to start
Register 2 is the speed scaled 0-20000
Don't forget the register is -1

CM – Climate Master MPC Heat pump controllers

1s based addressing

Conversions

Registers 30000 to 30008, 30023 to 41000 are read as a Float and read back as two consecutive registers (4 bytes reversed)

Consult the mfg's manual for more documentation and engineering units

DES – Pool dehumidification

1s based addressing

Conversions

Registers All AI point types are read as a Float and read back as two consecutive registers (4 bytes)

Consult the mfg's manual for more documentation and engineering units

Onicon – BTU Metering
0s based addressing
Conversions
Registers 6, 9, 16, 18, 20
Value * .1

Registers 21, 22, 23, 24
Value *.01

Consult the mfg's manual for more documentation and engineering units

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Siemens – Metering Devices

1s based addressing

Conversions

Registers 18 to 65, 149 to 176

Value * .1

Registers 261 to 276, 1031, 1032, 1033

Value *.01

Consult the mfg's manual for more documentation and engineering units

WRTU – Wireless I/O from Scientific Control Systems

0s based addressing

Conversions

Registers 64 to 72

Value * .1

0x00 (00-)	On-Board Raw
0x10 (16-)	ZigBee Input 1
0x20 (32-)	ZigBee Input 2
0x30 (48-)	(Unassigned / Expansion)
0x40 (64-)	On-Board Processed
0x50 (80-)	ZigBee Input 3
0x60 (96-)	ZigBee Input 4
0x70 (112-)	(Unassigned / Expansion)
0x80 (128-)	On-Board Digital Output (Coils 0-15)
0x90 (134-)	ZigBee Output1
0xA0 (160-)	ZigBee Output2
0xB0 (176-)	ZigBee Output3
0xC0 (192-)	On-Board Analog Output
0xD0 (208-)	(Unassigned / Expansion)
0xE0 (224-)	ZigBee Status Register
0xF0 (240-)	WRTU System Register

York – York Microgateway for Chillers and Air Handlers

All Registers are in the 40000 group

1s based addressing

Conversions

Registers 1 to 11, 19, 21 to 25, 28, 29, 35, 36, 44, 45

Value * .1

Consult the mfg's manual for more documentation and engineering units

11. Modbus Communications Structure

CIQ Uses the following functions within the driver

1	Read Coil Status	Registers 00000-09999
2	Read Input Status	Registers 10000-19999
3	Read Holding Registers	Registers 40000-49999
4	Read Input Registers	Registers 30000-39999
5	Write Single Coil	Registers 00000-09999
6	Write Single Register	Registers 40000-49999

General structure of the communications.

Byte format

Transmit

<u>Msg Byte</u>	<u>Description</u>	<u>Example</u>
Message(0)	address	0x01
Message(1)	function	0x03
Message(2)	out addr hi	0x00
Message(3)	out addr lo	0x01
Message(4)	CRC(hi)	
Message(5)	CRC(lo)	

Return

Message(0)	address	0x01
Message(1)	function	0x05
Message(2)	# data bytes	0x00
Message(3)	data1	0x00
Message(4)	data2	0x00
Message(5)	CRC(hi)	
Message(6)	CRC(lo)	

Revision History:

None