

Modbus communication Protocol

Connector Configuration Parameters

Mom. Time X50ms

There are four types of Coil Writes to the Omnii-Comm with Modbus protocol; standard, momentary, timed and "special". The coil address used determines the type of output. Coils between 1 thru 4096 are treated as standard Modbus latched coils. They are controlled using Modbus function codes 5 and 15 to set and reset the coils. Coils number 5001 thru 5500 are "Momentary". Physically they correspond to the first 500 standard coils. Momentary coils automatically return to their original state after a fixed period of time. This time is set by the value entered in Mom. Time multiplied by 50 msec. Coils numbered 6001 thru 6500 are timed outputs. They also map to the first 500 standard coils. Timed coils automatically return to their original state after a variable period of time. This time is set by writing to Holding Registers 6001 thru 6500. There are three "special" coils; 6501 Freeze Analogs, 6502, Freeze Accumulators and 6503 Freeze both Analogs and Accumulators.

Resync TimeX10ms

Modbus RTU messages use a 3.5 character "silent" time for message framing. Entering a number in this field will override the 3.5 character time to the time value entered here times 10 msec.

RTS ON DelayX10ms

Enter a number from 0 to 255 (0 to 2.55 seconds) to delay sending a message after turning on Request To Send (RTS). Commonly used with modem communication to allow additional time for the modems to synchronize.

RTS OFF DelayX10ms

Enter a number from 0 to 255 (0 to 2.55 seconds) to keep RTS on after a message has been sent. Commonly used to keep a radio on for a short period of time at the end of a message.

Handshake Option

If Full Handshake is selected the Omnii-Comm will assert RTS and wait for CTS before sending a message. RTS will be turned off after the message has been sent. If Constant Carrier is selected the Omnii-Comm will assert RTS when it sends its first message and leave it asserted. It will wait for CTS before sending. If Ignore CTS is selected, RTS will be asserted before sending a message and removed at the end of the message. The CTS input will be ignored. If No Handshake is selected, RTS will be asserted when the Omnii-Comm sends its first message. RTS will not be turned off at the end of the message. The CTS input will be ignored. If Activity Monitor is selected, the Omnii-Comm will check the DCD input before sending a message. If DCD is ON, the Omnii-Comm will delay sending the message.

Retry Count

If the port is being configured as a Modbus Master, this field will determine the number of retries the Master will attempt before declaring a failure when communicating with a Modbus Slave. This field is ignored if the port is set up as a Slave.

Sync bits Rev24+

You can fine tune the 3.5 "silent" time interval by entering values in this field. Entering 0 defaults to standard 3.5 character "silent" time. With a configuration of 8,N,1 each character has 10 bits, a start bit, 8 data bits and 1 stop bit. This would correspond to an entry in this field of 35 (3.5 X 10). Entering 25 would reduce the timer to 2.5 character times and setting it to 40 would increase it to 4 character times.

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Option Bit Parameters

Master or Slave

Check this box if the Omnii-Comm will be used as a Modbus Master device. Clear this box if the Omnii-Comm is to be used as a Modbus Slave device.

Use Radio Key

If checked, Bit 0 in a register specified by the "Radio Key Address" on the Header configuration screen will be turned ON before a message is sent and turned OFF after the message has been completed.

String by flow

This is a special function used in Modbus Slave operation only. It is used to return a user defined list of registers and coils when a Read Holding Register poll is received. The range of register numbers that will be used for this function is specified in the extension table. Most Modbus Masters do not support this function so you should not normally check this box.

32-bit enable

Check this box if the Omnii-Comm will be responding to a Read Holding Register poll with 32-bit data items. Normally, 32-bit data would be a Floating Point number. 32-bit data is read from Omnii-Comm Data Type 5. The range of register numbers that will be used for this function is specified in the Protocol Extension Table.

ASCII or RTU

Check this box for Modbus RTU protocol. Clear the box for Modbus ASCII protocol.

Gould or Daniel

This box changes the way the Omnii-Comm interprets the Register/Coil number field in a Modbus message. Standard addressing (Gould) is zero based in the protocol message. That means that if you want to read the first register, Register 1, the Starting Register number field in the message will be 0000. Clear this box for this type of addressing. Many Modbus implementations use 1 based addressing. Daniel Industries flow computers were one of the first popular devices that used Modbus protocol for their standard communications. They implemented their protocol using 1 based numbering. Thus the name. Check this box for 1 based addressing.

Protocol Extension Table Parameters

The Protocol Extension Table is used for Modbus Slave operation only. It is not used for Modbus Master operation. Click on the box to enable the Protocol Extension Table. Click on the button to bring up the specific options as detailed below:

First and Last 32-bit register.

Enter the range of register numbers that will be used for 32-bit data responses. 32-bit data is stored in Omnii-Comm Data Type 5. The first 32-bit register number will be mapped to the first entry (0) of Data Type 5. The next register number will map to Data Type 5, offset 1 and so on up to the maximum offset of 127.

First and Last String-by-Flow register.

Enter the range of register numbers that will be used for String-by-Flow responses. This register range will only be checked if String-by-Flow option is checked. A "String by Flow" register will return a user definable list of data points when the Modbus Master issues a Read Holding Register message.

String Register # (1-12)

You can define up to 12 "String by flow" registers. Enter a unique register number for each string you want to define. The register number must be in the range defined above. A -1 (\$FFFF) indicates the end of the register list.

String Address (hex)

A String by Flow response is defined by storing a Definition List somewhere in the Omnii-Comm Configuration RAM. Typically this is a static list that is not changed during operation. The entry in this field points to the starting address for the Definition List minus the RAM Start Address (typically 6000 hex). The Definition List is composed of 1 or more 4-byte entries. The first 2 bytes specify a Starting Register Number, the third byte specifies the Modbus Data Type to insert and the final byte specifies the number of 16-bit registers to insert. The Definition List is terminated by entering -1 (\$FFFF) for the next starting register number.

Data Type	Name
0	Input Status
1	Input Register
3	Coil Status
4	Holding Register
5	Long Word
6	Poll Status

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Poll Table Read Parameters

Modbus Address

The address of the Modbus Slave that data will be read from.

Modbus Function Code

The type of data that will be read. Valid selections are Coils (00000), Input Status (10000), Holding Registers (40000) or Input Registers (30000)

Starting Reg or Coil

The starting coil number or register number to use for the Read operation.

Number to Read

The number of Coils or Registers to Read

Bytes Expected

The number of bytes expected to be returned. If the Modbus device returns more or less data than expected the Omnii-Comm will generate an error.

Poll Table Write and Error Parameters

Modbus Address

The address of the Modbus Slave that data will be written to.

Modbus Function Code

The type of data that will be written. Valid selections are Coil (00000), Holding Register (40000), Multiple Coils (00000) or Multiple Holding Registers (40000)

Starting Reg or Coil

The starting coil number or register number to use for the Write operation.

Number to Write

The number of Coils or Registers to Write.

Bytes to Write

The total number of bytes to Write

Note: System Error Protocol Definitions are the same as Poll Table Write and Error Parameters

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Database Extension Table Parameters

Index	Name	Size:Max Length
0	# Status Cards Input Status Series 10000 points	2:256
1	# Input Regs Input Registers Series 30000 points	2:256
2	# Input Regs Ext Input Registers Series 31000 points	2:256
3	# Coils (#cards) Coils Series 00000 points	2:256
4	# Holding Regs Holding Registers Series 40000 points	2:256
5	32-bit Holding Registers Range determined in Protocol Extension Table	4:128
6	# H Regs 2XXX Holding Registers Series 42000 points	2:256
20	In Regs 3XXX Input Registers Series 33000 points	2:256
21	In Regs 2XXX Input Registers Series 32000 points	2:256