Modbus in MAC50-141

This section documents the implementation of Modbus in the JVL MAC50-141 motors.
Modbus was introduced in firmware version 8.03, with the first official release as v8.04.

Note that the implementation of Modbus in MAC50-141 is NOT identical to the implementation in
MAC400 and MAC800, mainly because of 16-bit versus 32-bit register usage and the more
advanced hardware resources in MAC400/800.

At the time of this writing, Modbus for the MAC50-141 is supported in interface module types:
FCx, FDx and FPx, all running the Modbus at 1 Megabit per second.

Features (as per 19 Jan 2011):
- Support for 1 Megabit modbus (no other baudrates)
- Automatic detection of MAC00-xx modules running Modbus at early start-up
- Supports command 3, Read Holding Registers, for single 16-bit and 32-bit reads.
- Supports command 16, Write Multiple Registers, for single 16-bit and 32-bit writes.

Half Duplex

How to select the Modbus protocol

Telegram type 3, Read Holding Registers

For a 16-bit read, the format is:

Master sends	Address	3	RegHi	RegLo	CountHi	CountLo	CRC1	CRC2
Byte index	0	1	2	3	4	5	6	7
Slave replies	Address	3	#Bytes	DataHi	DataLo	CRC1	CRC2	

For a 32-bit read, the format is:

Master sends	Address	3	RegHi	RegLo	CountHi	CountLo	CRC1	CRC2	
Byte index	0	1	2	3	4	5	6	7	8
Slave replies	Address	3	#Bytes	DataHi0	DataLo0	DataHi1	DataHi0	CRC1	CRC2

Telegram type 16 (0x10 hexadecimal), Write Multiple Registers

For a 16-bit write, the format is:

Master sends	Adr.	16	RegHi	RegLo	CountHi	CountLo	#Bytes	ValHi	ValLo	CRC1	CRC2
Byte index	0	1	2	3	4	5	6	7	8	9	10
Slave replies	Adr.	16	RegHi	RegLo	CountHi	CountLo	CRC1	CRC2			

For a 32-bit write, the format is:

```
;*Command 16 (0x10): Write multiple registers*/
;*Format: <adr>, 0x10,  RegHi, RegLo, CountHi, CountLo, NBytes, Val0Hi, Val0Lo, ..., CRC1,
CRC2*/
;*       [0]  [1]  [2]  [3]  [4]  [5]  [6]  [7]  [8]*/
;*reply:  <adr>, 0x10,  RegHi, RegLo, CountHi, CountLo, CRC1,   CRC2*/
;*-------------------------------------------------------------------------*/
```