B-MIDI-01 – 8 analog inputs (resistance, voltage, current), 8 digital inputs, 6 analog outputs, 8 relay outputs

- **bit address = 16 * (word address – 1) + 1**

Supported Modbus functions:
01 Read Coils – read bits
02 Read Discrete Inputs – read bits
03 Read Holding Registers – read words
04 Read Input Registers – read words
15 Write Multiple Coils – write bits
16 Write Multiple Registers – write words

Register type:
R – register is read only
W – register is write only
RW – register is read/write
RWE (default value) – register is read from EEPROM, written to EEPROM, default value in brackets

name	address	type	description	note
inputs	1	R	input values	bit 0 – input 1 … bit 7 – input 8
latched value	2	R	latched values **0 –** selected level **was not** latched since last enabling of the latch function **1 –** selected level **was** latched after last enabling of the latch function	latched value is cleared by resetting according bit in **latch enable** register bit 0 – input 1 … bit 7 – input 8
latch enable	3	RW	enabling the latch function **0 –** latch function disabled, according latched value is reset **1 –** latch function enabled, latched value will be set when level selected by **latch state** register is detected on particular input	bit 0 – input 1 … bit 7 – input 8
AI1 value	4	R	analog input values	values representation – see registers 1103 and 1104 **AI range**
AI2 value	5	R		
AI3 value	6	R		
AI4 value	7	R		
AI5 value	8	R		
AI6 value	9	R		
AI7 value	10	R		
AI8 value	11	R		
relay	12	RW	set / reset relay outputs	bit 0 – relay 1 … bit 7 – relay 8
AO1 value	13	RW	value range is 0000_{hex} – $0FFF_{hex}$ (0_{dec} – 4095_{dec}) 0000_{hex} – 0V	
AO2 value	14	RW		
AO3 value	15	RW		
AO4 value	16	RW		

AO5 value	17	RW	0FFFhex – 10V	
AO6 value	18	RW		
DI counters	19-34	RW	32 bit digital input counters – increments with negative edge, value rotates (FFFFFFFFh → 0)	reg. 19, 20 – DI 1 … reg. 33, 34 – DI 8
firmware version	1000	R	firmware version	FW version is **always** the same as this document version
module ID	1001	R	module identification number	module ID is F007hex
status LSB	1002 LSB	RW	module status – low byte **bit 0** – enable write to EEPROM **bit 1** – enable SW reset **bit 2** – disable write to all RW registers **bit 4** – EEPROM initialization **bit 5** – offset calibration **bit 6** – span calibration **bit 7** – enable calibration	**EEPROM initialization:** 1) start device in init mode (Init DIP switch high on power up) 2) set Init switch low 3) set status LSB bit 4, initialization is indicated in status MSB bit 2 **SW reset:** set bit 1, then write any non-zero value to reg. 1011 **calibration**: 1) start device in init mode (Init DIP switch high on power up) 2) set Init switch low 3) set status LSB bit 7, A/D coprocessor readiness is indicated in status MSB bit 3 4) select offset or span calibration by setting bit 5 or 6 of status LSB – can be set within one frame together with step 3 or 5 5) reset status LSB bit 7, finishing is indicated by resetting all calibration bits in status register span must be calibrated **after** offset

status MSB	1002 MSB	R	module status – high byte **bit 0** - 0 normal mode - 1 init mode **bit 1** - 1 next write to EEPROM register causes writing of **all** data to EEPROM - 0 next write to register is to RAM only **bit 2** – 1 – EEPROM initialized **bit 3** – 1 – A/D coprocessor is ready for calibration **bit 4** – 1 – write to all RW registers disabled **bit 5 –** 1 – SW reset enabled **bit 6 –** 1 – couldn't read valid data from EEPROM, calibration will cause writing of **all** data to EEPROM **bit 7** – 1	bit 1 ... indication that command given by bit 0 in status LSB was accepted bit 2 ... indication that command given by bit 4 in status LSB was accepted bit 3 ... indication that command given by bit 7 in status LSB was accepted bit 4 ... indication that command given by bit 2 in status LSB was accepted bit 5 ... indication that command given by bit 1 in status LSB was accepted
address	1003	RWE (1)	modbus address of the module	registers change immediately, communication parameters change after restart (data must be written to EEPROM)
baud rate	1004	RWE (13)	10_{dec} … 1 200bps 11_{dec} … 2 400bps 12_{dec} … 4 800bps 13_{dec} … 9 600bps 14_{dec} … 19 200bps 15_{dec} … 38 400bps 16_{dec} … 57 600bps 17_{dec} … 115 200bps	
serial port settings	1005	RW (0)	**bits 0, 1** – parity 0 none 1 even 2 odd **bit 2** – stopbits 0 one stopbit 1 two stopbits	
up time	1006 1007	R	time in seconds since last restart or power up	
serial number	1008 1009	RWE (unique)	module serial number, can be written if it is zero	not implemented yet
EEPROM writes	1010	R	EEPROM writes counter	counter 0 …. FFFEh, counting stops at value FFFEh
SW reset	1011	RW	if **status LSB bit 1** (and status MSB bit 5) is set, writing non-zero value causes SW reset	
calibrations	1100	R	A/D coprocessor EEPROM writes counter (count of calibrations)	counter 0 …. FFFEh, counting stops at value FFFEh
latch state	1101	RWE (0)	level to latch **0** – low **1** – high	bit 0 – input 1 … bit 7 – input 8

range for AI channels 1, 2, 3 and 4	1102	RWE (0x2222)	**1 …Pt1000** (-50 to 150 °C) (-5000 to 15000) **divide value by 100** to get degree Celsius **2 … voltage 0 V – 10 V** (0 to 10000) **divide value by 1000** to get volts **3 … resistance 0 – 1600 ohm** (0 to 16000) **divide value by 10** to get ohm **4 … current 0 – 20 mA** (0 to 20000) **divide value by 1000** to get miliampere **5 … resistance 0 – 5000 ohm** (0 to 50000) **divide value by 10** to get ohm	**current 0 - 20mA** appropriate DIP switch must be turned on
range for AI channels 5, 6, 7 and 8	1103	RWE (0x2222)		**current 0 - 20mA** external 125ohm resistor must be connected
relay com	1104	RWE (0)	**0** – communication loss is ignored for particular output **1 –** communication loss causes setting of particular output to value given by **relay state** register	bit 0 – relay 1 … bit 7 – relay 8
relay state	1105	RWE (0)	particular output is set to value given by this register if valid modbus frame wasn't received for time given by **relay time** register and is enabled by **relay com** register	bit 0 – relay 1 … bit 7 – relay 8
relay time	1106	RWE (30)	time period in seconds since last valid modbus frame to set outputs to values given by **relay com** and **relay state** registers	value of zero deactivates communication loss feature
relay start enable	1107	RWE (0)	**0** – no action on particular output on start of the module **1 –** output is set to value given by **relay start** register	bit 0 – relay 1 … bit 7 – relay 8
relay start	1108	RWE (0)	particular output is set to value given by this register on start of the module if enabled by **relay start enable** register	bit 0 – relay 1 … bit 7 – relay 8