L-420 MODBUS Application Protocol

Contents

1. Data format

Protocol	MODBUS RTU
Baud rate	9600 bps
Data bits	8
Stop bits	1
Parity	none (N)

1.1. Data frame format

Start marker	Address	Function	Data	CRC	End marker
T1-T2-T3-T4	8 bits	8 bits	N x 8 bits	16 bits	T1-T2-T3-T4

T1-T2-T3-T4 – line IDLE state, lasting at least 3.5 byte

2. Device registers description

Address is given in decimal. Column data format determines how the data is coded; available formats are:
- float – 32 bits floating point quantity
- uint16_t – fixed point unsigned 16 bit quantity

R/W column determines whether is possible reading (R), writing (W) or reading and writing (R/W) of the register.

No	Address (dec)	Data format	R/W	Description
1	01	uint16_t	R/W	Number of the currently selected measuring range [0..2]
2	02	uint16_t	R/W	Number of subsequent conversions to calculate the result [1..64]. The result is averaged value from set of subsequent conversions (moving average). One conversion lasts 160ms.
3	03	uint16_t	R	Meter type: 0x0001 – Photometer 0x0002 – Radiometer 0x0003 – PAR meter 0x0081 – Luminance meter 0x0082 – Radiance meter 0x0083 – Photon radiance meter

4	04	uint16_t	R	Status (1 – active): bit0 – measuring range overload bit1 – detector zeroing in progress bit2 – measuring system zeroing in progress bit3 – result calibration factor (KE) out of range bit4 – current loop calibration factor (KL) out of range bit5 – current loop calibration factor (DAC0) out of range bit6 – current loop turned on bit7 – new data has been measured (since the last read of the average result – register 05 or 06) – only in firmware version 2.0.0006 and higher
5	05-06	float	R	Result in units of measured value (average value of the specified number of subsequent conversions)
6	07-08	float	R	Result in units of measured value (minimum value of the specified number of subsequent conversions)
7	09-10	float	R	Result in units of measured value (maximum value of the specified number of subsequent conversions)
8	11-12	float	R	Measuring range 0 in units of measured value
9	13-14	float	R	Measuring range 1 in units of measured value (0 – means no range)
10	15-16	float	R	Measuring range 2 in units of measured value (0 – means no range)
11	17	uint16_t	R	Binary value of current temperature (WB): $T[°C] = (1100 / 1024 * WB – 500) / 10$
12	18	uint16_t	R	Binary value of temperature (WB) in which measuring system zeroing was carried out: $T[°C] = (1100 / 1024 * WB – 500) / 10$
13	19	uint16_t	W	Command: 0x0001 – start detector zeroing (must be carried out with detector covered) 0x0002 – start measuring system zeroing 0x0003 – store measuring system zeroing factor

3. Implemented functions

Function code	Description
0x03	Read holding registers
0x06	Write single register
0x2B	Read device identification
0x64	Set MODBUS address (device specific function)

3.1. Set MODBUS address (device specific function)

New MODBUS address should be placed after the function code. Using MODBUS broadcast address is not allowed. Device in response uses old address, new address is valid from the next data frame. Example of setting the address 7.

Request		Response	
Field name	Value (hex)	Field name	Value (hex)
Device address	0x01	Device address	0x01
Function	0x64	Function	0x64

MODBUS new address	0x07	MODBUS new address	0x07
CRC	16 bits	CRC	16 bitów

4. Bibliography

„Modbus_Application_Protocol_V1_1b.pdf" downloaded from http://www.modbus.org.