

ULS10
Ultrasonic Distance/Level Sensor



Modbus Serial communication protocol

I, Master slave communication parameters set

1.1 Single frame format:

Default baud rate bps: 300-19200(the bps will be difference according to the different slave units model)

Data bit: 8

parity bit:N

Stop bit:1

If Modbus run with RS232 or RS485 compatible serial interface, data can use RTU format

1.2 RTU command code:(The efficiency of RTU format is better with the same frequency, then this protocol not use the ASCII code)

Read registers command:3(hexadecimal 0x03) -function code 03, can read one/multiple registers

Preset Multiple Registers command: 16(hexadecimal 0x10)-Function code=16, Preset multiple registers.

I, Data Format

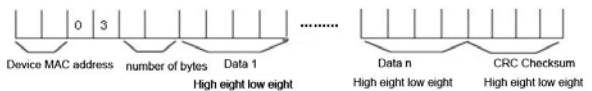
Device MAC address, command code, registers address, Data length, Real-time data register, CRC checksum.

Read register command: (code: 0x03)

Command

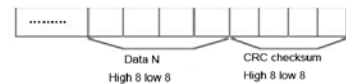
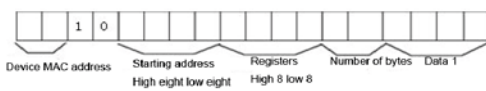


answer

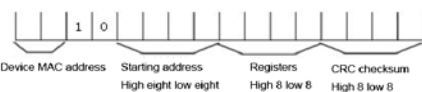


Preset multiple registers command: (code: 0x10)

command



Answer



2.10, Real time data shall follow IEEE754 standard. Sequence of sending shall with small format, thus upper byte shall be in front and lower byte shall be at back.

For example: (decimal system) 1= 3F 80 00 00 (hexadecimal)

2.21, All address of the registers in data flow shall be marked with double byte. For example, register with address 20: 20=00 14

2.32, Number of register is shown with double byte.

For example: read data of 10 registers from address 20: 10=00 0A

2.43, Data length of answering of the sub-machine shall be marked with single byte.

For example: If there were 30 bytes sent back: 30= 1E

III, Illustration of address. Menu parameter, operational parameter and control parameter were addressed together from 0 to 255.

All content below are with decimal system except those marked with 0X:

1. Address of operational parameter: 0x00-0X04 main operational parameter of the sub-equipment.

2. Address of menu parameter: 0X14-0X33 acceptance menu parameter of the sub-equipment

3, Address of control parameter: 0X64-0X6A is reflection of L1, L2, L3, L4, LED, LCD analog control.

Data in these addresses: d7=1 is controlled by MODBUS; d7=0 release control. d0=1 or =0 means control.

0X6E-0X70: is reflection of control of root, Ghost, reGhost (could find examples by operating the software soft_MODBUS)

IV. Example of MODBUS data communication (data flow under modbus protocol)

1, Data structure of the host computer:

ADDR COM REG_ADR_H REG_ADR_L LONG_H LONG_L CRC_L CRC_H

Explanation:

ADDR: address of the sub-equipment (0~255 means 0X00~0XFF)

COM: control command (03: read data from register; 16: write data to register)

REG_ADR_H: upper 8 byte of original address of register in sub-equipment

REG_ADR_L: lower 8 byte of original address of register in sub-equipment

LONG_H: read upper 8 byte of number of register

LONG_L: read lower 8 byte of number of register

CRC_L: lower 8 byte of previous CRC data calculation result

CRC_H: upper 8 byte of previous CRC data calculation result

1.1, If the host computer send: 01 03 00 00 00 04 44 09 to sub-equipment

1#, which is a command to read 4 registers from address 0.

01: address of sub-equipment

03: read recommend

00 00: register address 0 in hexadecimal

00 04: number of register in hexadecimal

44 09: proof test value of CRC

1.2, Data structure of sub-equipment answering: ADDR COM

LONG DATA(N) ... CRC_L CRC_H

Explanation:

ADDR: address of the sub-equipment (0~255)

COM: command of return code (03-read data from register; report to host- what data had been answered)

LONG: byte number of answer from sub-equipment

DATA(N): byte number of answer from sub-equipment could not be exceed 64, restricted by Ram

CRC_L: lower 8 byte of previous CRC data calculation result

CRC_H: upper 8 byte of previous CRC data calculation result

(CRC is short for Cyclical Redundancy Check)

