

SERIAL BUS COMMUNICATION PROTOCOL FOR MBS6

A) HARDWARE layer :

3 wire RS485 (A as non inverting wire , B as inverting wire, GND), fixed baud rate 19.2 kbps, 1 stop bit, no parity, half duplex, max. 63 fancoils .

Each fancoil is assigned a Terminal Address, ranging from 1 to 63.

The address can be user programmed from the MBS6 display panel by the following procedure:

1) switch fancoil off from MBS6 room display unit

2) enter the following password:

Down arrow key

Up arrow key

Up arrow key

Up arrow key

Down arrow key

Up arrow key

Down arrow key

3) the display lights up, showing the current Terminal Address

4) change address as desired, with the Up key and the Down key

5) when done exit by the on/off key

B) SOFTWARE layer.

PC or PLC is the bus master . All fancoils are slaved to the master commands.

All transactions are initiated by the master, whereas any fancoil can only respond to commands. Fancoils cannot “call” or interrupt the PC.

PC can thus monitor the status of any fancoil by polling them all repeatedly, one at a time. Only two type of transactions can take place on the bus: read transactions and write transactions. A write transaction is coded by bit 7 of Register address being a 0, a read transaction is coded by bit 7 of Register address being a 1.

Read transactions are used by the PC to monitor the status of each fancoil and to read the fancoil registers. Write transactions are used by the PC to send commands and to write into the fancoil registers, according to the following layout:

- 1) each fancoil is assigned a Terminal Address, ranging from 1 to 63.
If a fancoil is assigned Terminal Address 0, that fancoil is disconnected from the bus and will not respond to any command
- 2) each fancoil is equipped by 5 registers.
each register is assigned a Register Address
PC can read or write these registers, by sending out the transmission sequences as described at paragraph 3) and 4)

These registers are:

- a) STATUS REGISTER : read/write, address 04H, made up as follows:
(rightmost bit is bit 0, least significant bit)

0, FANONLY, PDIS, ELECTRIC, FANMODE, CEL/FAR, C/H, ON/OFF

ON/OFF	: 0 = fancoil off , 1 = fancoil on
C/H	: 0 = cooling, 1 = heating
CEL/FAR	: 0 = Celsius , 1 = Farenheit
FANMODE	: 0 = fan speed is set automatically by system : 1 = fan speed is set by user, from the room display
ELECTRIC	: electric heating mode : 0 = off , 1 = on

PDIS : Program disable bit. When this bit is 1 cabin user cannot change the MBS6 set up

FANONLY : when 1 turns on FAN-ONLY mode

0 : most significant bit is always zero

- Important : CEL/FAR bit sets the temperature units to be used by the MBS6 when displaying the temperature on the room display panel only.
Temperature values used on the serial bus are Celsius referenced regardless of the setting of this bit.
- b) ROOM TEMPERATURE register : read only , address 05H, stores the ambient temperature, in half Celsius degree units, hex coded.
- c) TEMPERATURE SET POINT: read/write, address 06H, stores the temperature set point, in half Celsius degree units, hex coded, from 10 °C to 30 °C.
- d) MFAN SPEED register : read/write, address 07H, stores the fan speed when fan is in manual mode (bit FANMODE of register 04H = 1)
It ranges from 1 to 10, hex coded
- e) RFAN SPEED register : read only , address 09H, stores the actual fan speed, from 1 to 10, hex. coded. Actual fan speed is = MFAN SPEED when fan is in manual mode. Actual fan speed is automatically set by system when fan is in automatic mode.

- 3) WRITE TRANSACTION protocol: in order to send out a write transaction PC must output the byte stream as follows

FEH, TERMINAL ADDRESS, REGISTER ADDRESS, DATA

TERMINAL ADDRESS = fancoil address

REGISTER ADDRESS = register address to be accessed. **Bit 7 del Register Address must be 0** so that MBS6 knows that this transaction is a write command

DATA = byte to be written to the selected register

- This 4 byte sequence must be transmitted in less than 100 msec, otherwise it will be timed out.

- 4) READ TRANSACTION : any register can be read out by PC by sending the following byte stream

FEH, TERMINAL ADDRESS, REGISTER ADDRESS,

Bit 7 of Register Address must be 1

Upon receiving this sequence the interrogated MBS6 responds with the value contained in the selected register. Answer is loaded onto the field bus 1 msec after the end of the reading stream. PC software designer must ensure that the bus is released before this delay is over, otherwise bus collision will result.

After sending the register value as requested the interrogated fancoil releases the bus after another 10 msec, so that the PC must wait at least that amount of time, before initiating another bus transaction.

- 5) GLOBAL WRITE : if PC sends out a write transaction to Terminal Address 127, all fancoils connected to the bus will carry out the transmitted write command. This procedure is very handy when the same command is to be sent to all fancoils, like , for example, turning them all on, or putting them all into cooling, or heating mode.