

TECHNICAL INFORMATION:

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|-----------------|---|-------|------------|
| PRODUCT: | A--LAS-CON-sensor-control-unit | Date: | 31.01.2006 |
| | <i>Software - state: V1.2</i> | | (wk) |
| TOPIC: | RS232-Interface-Protocol for A-LAS-CON- sensor-control-unit PC-Software-Version A-LAS-CON-Scope V1.2 | | |

RS232 Interface-Protocol PC ↔ A-LAS-CON unit

- Standard RS232 serial interface, no hardware handshake
- 3-wire connection: GND, TX0, RX0
- Speed: 19200 baud, 8 data-bits, no parity-bit, 1 stop-bit, binary-mode

The control device (PC or PLC) have to send a frame of *18-words* (*1 word = 2 byte = 16 bit*) to the *A-LAS-CONTROL* hardware. All words must be transmitted in binary format. The most significant byte must be transmitted first (MSB-first).

METHOD:

The microcontroller of the *A-LAS-CONTROL* unit is permanently reading (polling) the input-buffer of the RS-232 module. If the incoming word = *0x0055* (*0x55 hexadecimal = 85 decimal*), this is interpreted as the synchronisation-event **<sync-word>**. After this, the 2. word with the order number **<order-word>** is read in by the microcontroller.

The order word **<order-word>**, is followed by 16 further words **<parameter-word>**.

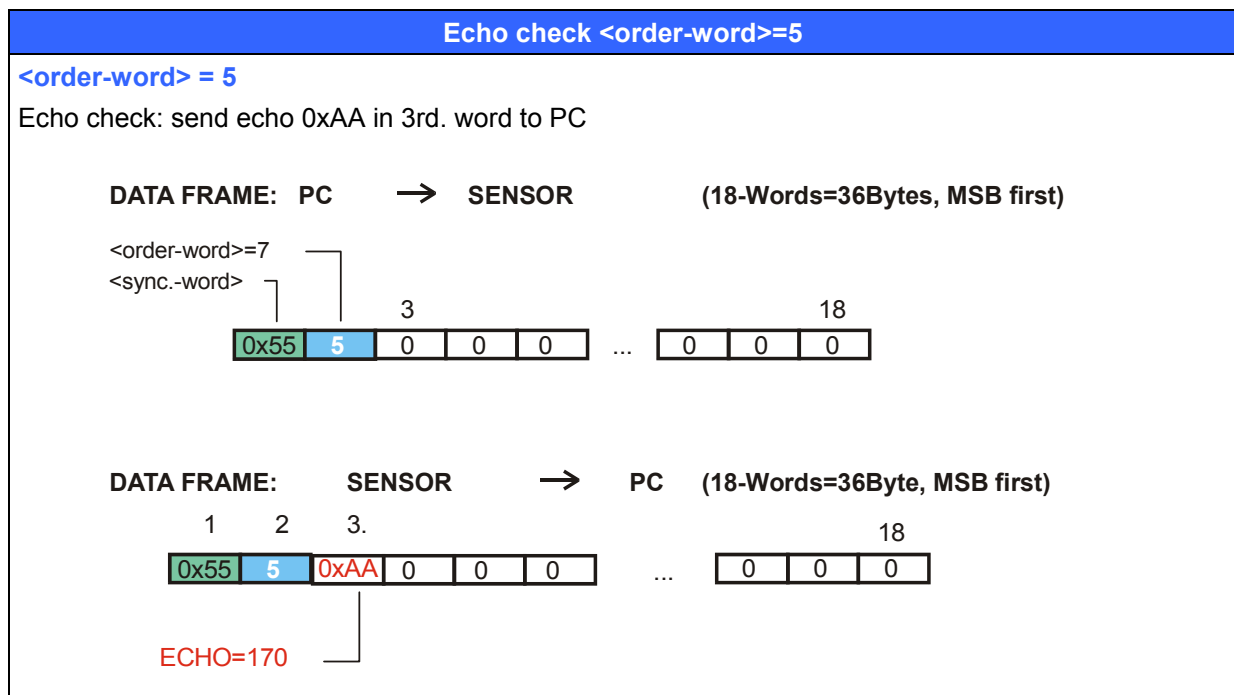
After reading the complete data-frame (18-words = 36 bytes), the *A-LAS-CON* unit executes the order which is coded at the 2.word **<order-word>**.

Format of the parameter-frame:

| Word No. | Meaning | Comment |
|----------|-----------------------------------|---|
| 1 | <sync-word> = 0x0055 | hex-code 0x0055, binary=00000000 01010101, dez.=85 |
| 2 | <order-word> | Order word (c.f. table below) |
| 3 | parameter POWER | Laser Intensity (0 ... 1000) at transmitter |
| 4 | parameter REFERENCE | Teach-value (1 ...1000) |
| 5 | parameter TOLERANCE | Tolerance-value (1 ...1000), trigger-value for EVALMODE:DIFF |
| 6 | parameter HYSTERESIS | Hysteresis-value (for tolerance-window) (0 .. 130) |
| 7 | parameter POLARITY | Polarity setting for OUT0,OUT1 (0=DIRECT, 1=INVERSE) |
| 8 | parameter HOLD | Hold-time for OUT0,OUT1 (10,20,50,100,200,500,100,65535) |
| 9 | parameter HWMODE | Hardware-Mode (0:Disable All, 1:Enable All, 2:Enable Button, 3: Enable Potentiometer) |
| 10 | parameter AVERAGE | Average-value (1,2,4,8,16,32,64,128,256,512,1024 or 2048) |
| 11 | parameter EVALMODE | Evaluation-Mode (0:RAW-A, 1:A/Amax, 2:DIFF) |
| 12 | parameter MAXMODE | Unload actual maxima (0:off, 1:on) |
| 13 | parameter TRGLEVEL | Trigger-level for internal trigger |
| 14 | parameter TRGMODE | Trigger-mode (0:CONT, 1:INTERN, 2:EXT/HI, 3:EXT/LO) |
| 15 | parameter SDELAY | Scan-delay (6=10ms, 27=10ms, 210=50ms, 470=100ms, ...) |
| 16 | parameter DBUFLEN | Length of differential-buffer (new-values) (1,2,4,8,16,32,64) |
| 17 | parameter ANAMODE | Analog output mode (0=DIRECT 0..10V, 1=DIFFERENTIAL) |
| 18 | Parameter FREE | Parameter not used (default=0) |

| Meaning of the 2 nd word of the data-frame: <order-word> | | |
|---|---|--|
| Value | Meaning / Action | |
| 0 | Nop | no operation |
| 1 | Send parameter from PC into RAM of A-LAS-CON | volatile: 18 words PC \Rightarrow A-LAS-CON-RAM |
| 2 | Get A-LAS-RAM-parameter | 18 words, A-LAS-CON-RAM \Rightarrow PC |
| 3 | Send parameter from PC into EEPROM of A-LAS | 18 words, PC \Rightarrow A-LAS-CON-EEPROM |
| 4 | Get EEPROM parameters of A-LAS | 18 words, A-LAS-CON-EEPROM \Rightarrow PC |
| 5 | Echo check: Get echo of A-LAS, line ok = 0xAA | 18 words, 1 st word=0x00AA (Echo=170) |
| 6 | Activate Teach at A-LAS-CON, store in RAM | 18 words PC \Rightarrow A-LAS-CON-RAM |
| 7 | Get software version info from A-LAS-CON | 36 words, A-LAS \Rightarrow PC (version-string) |
| 8 | Get measured values out of A-LAS-CON-RAM | 18 words, A-LAS-CON-RAM \Rightarrow PC |
| 9 | Get data-buffer-block out of A-LAS-CON-RAM, | 64 words, A-LAS-CON-RAM \Rightarrow PC |

EXAMPLES:

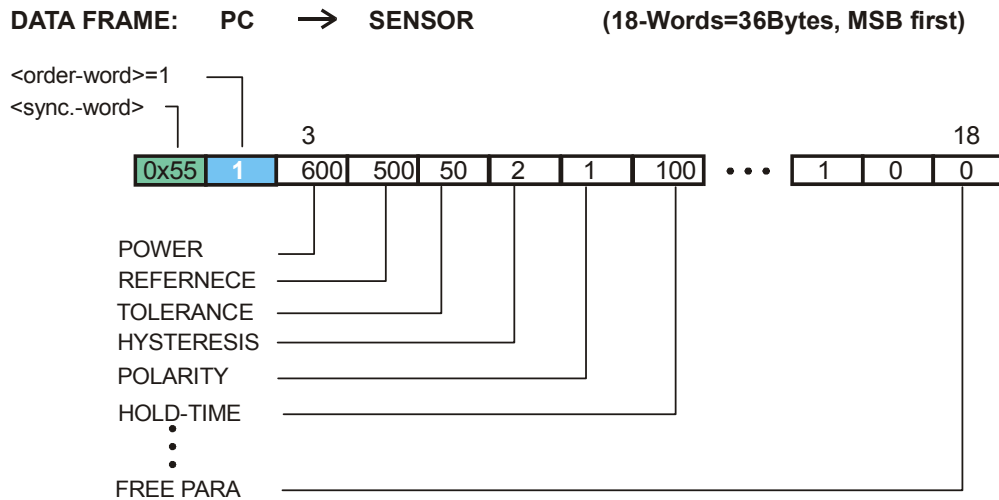


SEND parameter to A-LAS-CON-RAM <order-word>=1

<order-word> = 1

Send actual parameters and store the frame into L-LAS-RAM.

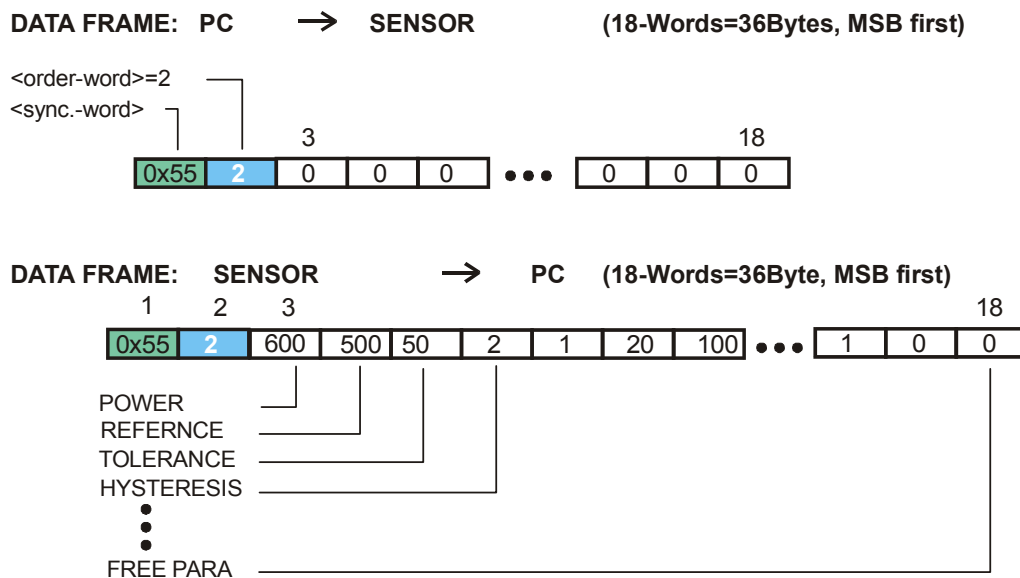
No data frame is send back to the PC after the parameter frame is read in !!!



GET A-LAS-CON-RAM parameter <order-word>=2

<order-word> = 2

GET A-LAS-CON-RAM parameter



GET measured-values of A-LAS-CON unit <order-word>=8

<order-word> = 8

The A-LAS-CON-unit sends the actual measured values to the PC.

The 3. word is the actual measurement value **NORM**

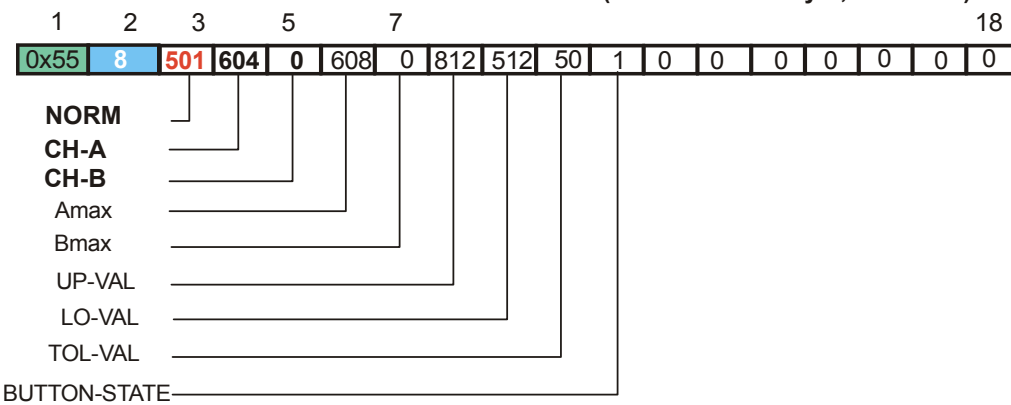
The 4. word is the raw-value of channel : **CH-A**

The 5. word of the raw-value of channel: **CH-B**

DATA FRAME: PC → SENSOR (18-Words = 36 Bytes, MSB first)



DATA FRAME: SENSOR → PC (18-Words = 36 Byte, MSB first)



NORM := measurement value of A-LAS-CON-unit
CH-A := raw-value of channel CHA
CH-B := raw-value of channel CHB (actually not used)
Amax := actual maximum value of CHA
Bmax := actual maximum value of CHB (actually not used)
UP-VAL := highest value in evaluated data curve after trigger-event
LO-VAL := lowest value in evaluated data curve after trigger-event
TOL-VAL := actual tolerance value (potentiometer – settings-value if enabled)
BUTTON-STATE := actual hardware-button-state