

## TECHNICAL INFORMATION:

<b>PRODUCT:</b>	<b>A-LAS-CON1-DIFF sensor-control-unit</b>	Date:	03.03.2006
	<i>Software - state: V1.3</i>		(wk)
<b>TOPIC:</b>	RS232-Interface-Protocol for A-LAS-CON1-DIFF sensor-control-unit PC-Software-Version A-LAS-CON-DScope V1.3 New ORDER=11 Reset Amax, Additionally MEANVAL in ORDER=8 !		

### RS232 Interface-Protocol PC ↔ A-LAS-CON1-DIFF 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>**.

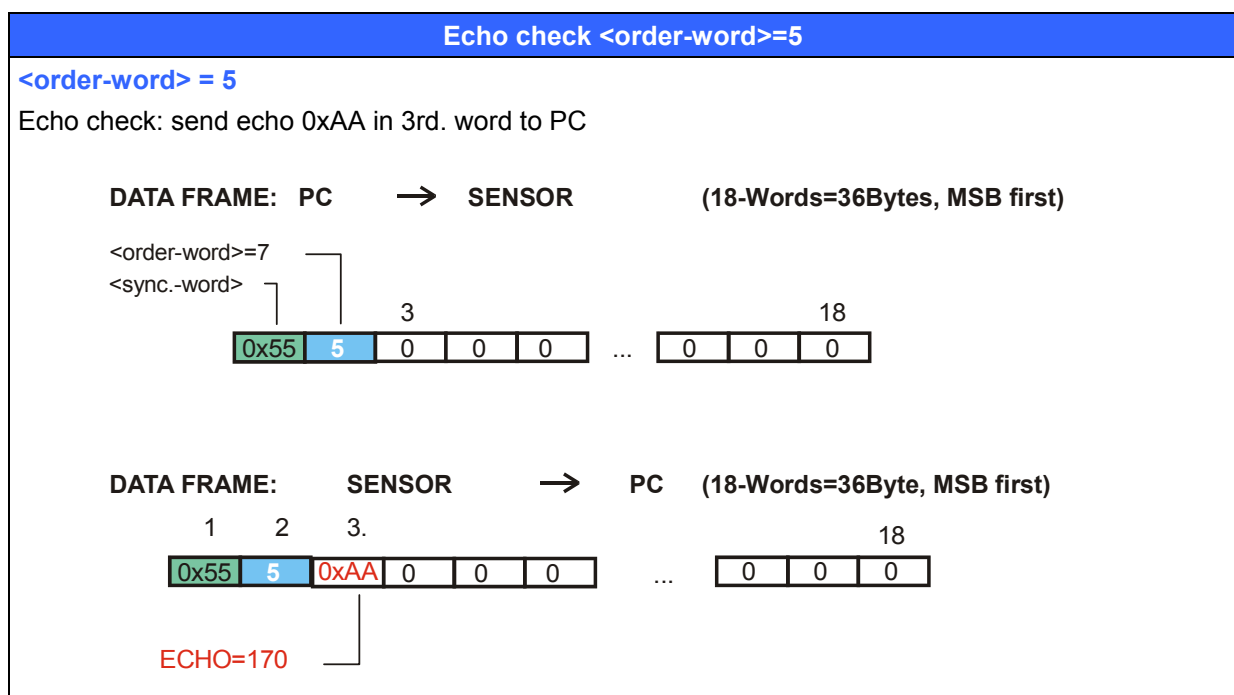
After reading the complete data-frame (18-words = 36 bytes), the *A-LAS-CON* unit executes the order which is coded at the 2.word **<order-word>**.

#### Format of the parameter-frame:

Word No.	Meaning	Comment
1	<b>&lt;sync-word&gt;</b> = 0x0055	hex-code 0x0055, binary=00000000 01010101, dez.=85
2	<b>&lt;order-word&gt;</b>	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 <sup>nd</sup> 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 <sup>st</sup> 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	<b>Get measured values out of A-LAS-CON-RAM</b>	<b>18 words, A-LAS-CON-RAM <math>\Rightarrow</math> PC</b>
9	Get data-buffer-block out of A-LAS-CON-RAM,	64 words, A-LAS-CON-RAM $\Rightarrow$ PC
10	Reset Upval and LOval Maxima/Minima-values	18 words, PC $\Rightarrow$ A-LAS-CON-RAM
11	Reset Amax, Attention sensor must be uncovered!	18 words, PC $\Rightarrow$ A-LAS-CON-RAM

### EXAMPLES:

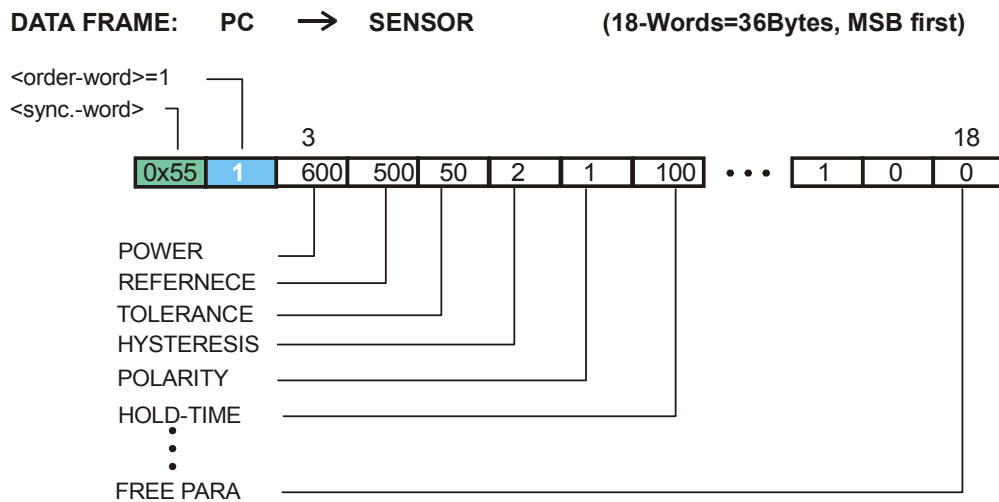


### SEND parameter to A-LAS-CON-RAM <order-word>=1

<order-word> = 1

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

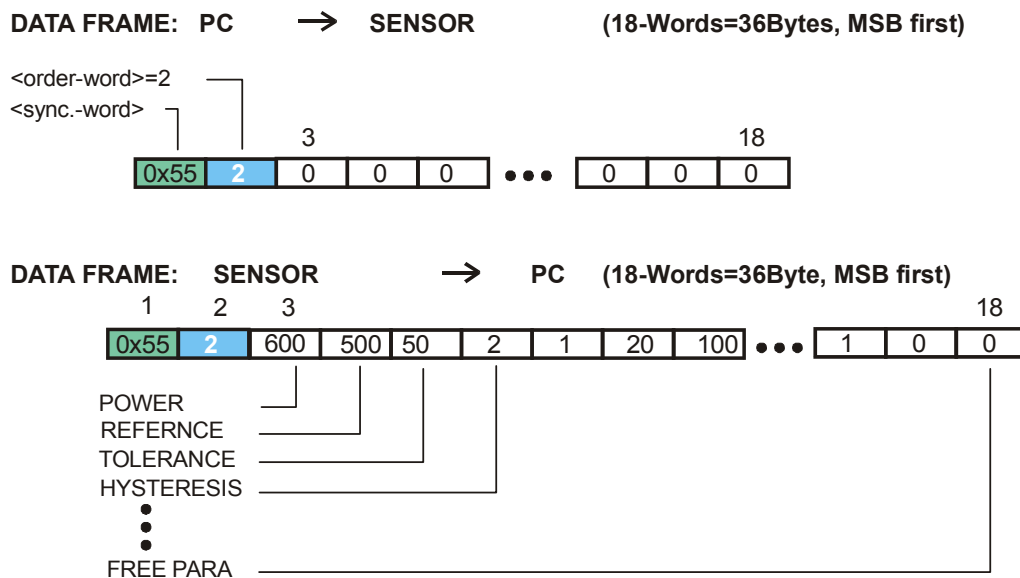
**No data frame is send back to the PC after the parameter frame is read in !!!**



### 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**

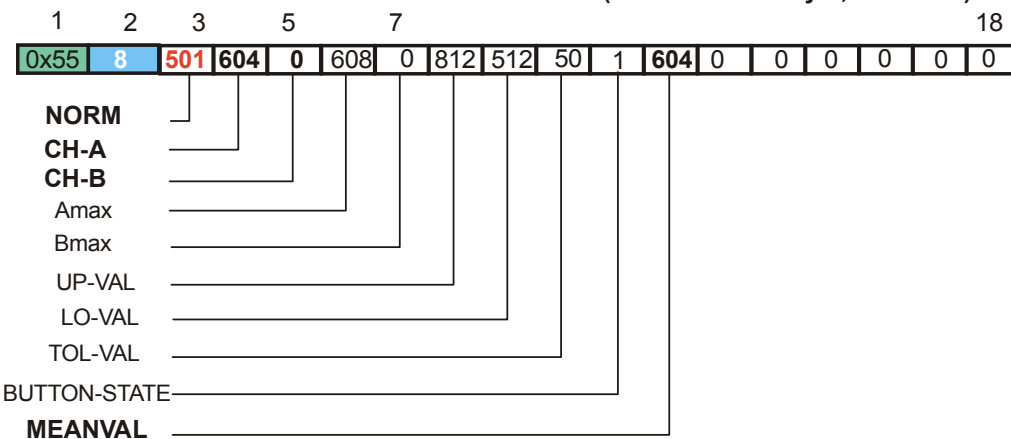
The 5. word of the raw-value of channel: **CH-B**

The 12. word is the average of the 192-word long differential-buffer: **MEANVAL**

**DATA FRAME: PC → A-LAS-CON1-DIFF (18-Words = 36 Bytes, MSB first)**



**DATA FRAME: A-LAS-CON1-DIFF → 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  
MEANVAL := average of the differential-buffer (192-words)