APPENDIX A. REMOTE CONTROL

Two serial interfaces are used in SVAN 945A instrument: classical, relatively slow RS 232 and new, relatively fast USB 1.1. These interfaces enable one to control remotely the unit.

The RS 232 interface complies with CCIT V.24 standard, except connector - LEMO compatible type ENG.0B.305. Practically all Personal Computers can be linked to the instrument by means of this interface. The maximum available transmission speed is equal to 115200 bits / sec.

Note: *For reliable operation of the RS 232, proper synchronisation of the transmission by* ***DSR*** *and* ***DTR*** *lines (according to their definitions) is required.*

The USB 1.1 interface is the serial one working with 12 MHz clock. Its speed is relatively high and it ensures the common usage of USB in all produced nowadays Personal Computers.

The functions which are developed in order to control data flow in the serial interfaces (RS 232 or USB 1.1) ensure:
- Bi-directional data transmission,
- Remote control of the instrument.

The user, in order to programme the serial interface (RS 232 or USB 1.1), has to:
1. send "the function code",
2. send an appropriate data file
or
3. receive a data file.

A.1. INPUT / OUTPUT TRANSMISSION TYPES

The following basic input / output transmission types (called functions) are available:

#1 input / output of the control setting codes,
#2 read out of the measurement results in the **SLM** mode,
#3 read out of the measurement results in **1/1 OCTAVE** or **1/3 OCTAVE** mode,
#4 read out of the data file from the internal Flash-disc,
#5 read out of the statistical analysis results.

A.2. FUNCTION #1 – INPUT / OUTPUT OF THE CONTROL SETTING CODES

#1 function enables the user to send the control setting codes to the instrument and read out a file containing the current control state. A list of the control setting codes is given in Tab. A.1. The format of #1 function is defined as follows:

#1,Xccc,Xccc,(...),Xccc;

or

#1,Xccc,X?,Xccc,(...),X?,Xccc;

where:

X - the group code, **ccc** - the code value,
X? - the request to send the current X code setting.

The instrument outputs in this case a control settings file for all requests X? in the following format:

#1,X ccc,X ccc,(...),X ccc;

In order to read out all current control settings the user should send to the device the following sequence of characters:

#1;

The instrument outputs in this case a file containing all control settings given in Tab. A1 in the format:

#1,X ccc,X ccc,(...),X ccc;

Example: The following sequence of characters send by the instrument as an answer for the mentioned above request:

#1, U945A, N4106, W514, V1, H0, J1, Q0.2, M1, R2, P1, F2:1, F3:2, F3:3, f0, C1:1, C0:2, C2:3, B0:1, B2:2, B4:3, b0, d200, D1s, K5, L0, r1, w0, a0, m0, s0, o6, t17, l75, p20, q30, Y3, S0, XA0, XR0, XS0, XM0, Xm0;

means that the SVAN 945A is investigated (U945A), which number is 4106 (N4106). The instrument has the software version number 5.14 (W514), the polarisation of a microphone is 200 V (V1), the free field correction is selected H0), the compensation filter is switched on (J1), the calibration factor is equal to 0.2 dB (Q0.2), the Sound Level Meter mode is selected (M1) so the range is 130 dB (R2). The current displayed profile is 1 (P1), the **A** filter is selected in profile 1 (F2:1), the **C** filter - in profile 2 (F3:2) and the **C** filter - in profile 3 (F3:3). The **HP** filter is selected for **1/1 OCTAVE** or **1/3 OCTAVE** analysis (f0). The **FAST** detector is selected in profile 1 (C1:1), the **IMPULSE** detector - in profile 2 (C0:2) and the **SLOW** detector - in profile 3 (C2:3). The buffer is not filled by the results from profile 1 (B0:1), the **MAX** values are stored in the files of the buffer from profile 2 (B2:2), the **RMS** values are stored in the files of the buffer from profile 3 (B4:3). The results of **1/1 OCTAVE** or **1/3 OCTAVE** analysis are not stored in the files of the buffer (b0), the measurement results has to be stored in a file of the buffer every 200 millisecond. (d200). The integration time is equal to 1 second (D1s), the measurement has to be repeated 5 times (K5) , the linear detector is selected to the **LEQ** calculations (L0), the narrow-band frequency analysis is performed in 22.4 kHz band (r1), during the analysis the **HANNING** window is used (w0) as well as the linear averaging (a0), the triggering is switched off (m0), the SPL result from the first profile is used as the triggering signal (s0), the value of the sixth **1/1 OCTAVE** filter is treated as a source of the triggering signal for **1/1 OCTAVE** analysis (o6), the value of the seventeenth **1/3 OCTAVE** filter is treated as a source of the triggering signal for **1/3 OCTAVE** analysis (t17), the trigger level is equal to 75 dB (l75), the number of the records before the triggering saved in a file of the buffer is equal to 20 (p20), the number of records registered after the moment in which the measured signal does not fulfil any longer the condition of the triggering is equal to 30 (q30), the delay of the start of the measurements is equal to 3 seconds (Y3), the instrument is in the Stop state (S0), auto save is switched off (XA0), RAM file is switched off (XR0) and the statistics are not saved (XS0), saving of Max spectrum is switched off (XM0) as well as Min spectrum (Xm0).

Note: *All bytes of that transmission are ASCII characters.*

A.3. FUNCTION #2 – MEASUREMENT RESULTS READ-OUT IN THE SLM MODE

#2 function enables one to read out the current measurement result from the selected profile in the SLM Mode.

Notice: *This function can also be programmed while measurements are taking place. In this case, the RMS values measured* ***after entering #2 function*** *are sent out.*

#2 function has the format defined as follows:

#2,p,X?,X?,X?,(...),X?;

where:

X - the code of the result,
p - the number of the profile (1, 2 or 3).

Notice: *After finishing the measurement,* ***#2*** *function is no longer active and has to be reprogrammed in order to read-out successive measurements.*

The instrument sends the values of results in the format defined as follows:

#2,p,Xccc,Xccc,Xccc,(...),Xccc; (where **p** - the number of the profile: 1, 2 or 3)

or

#2,?; (when the results are not available).

The codes of the results are defined as follows:

T time of the measurement (ccc – value in seconds);
V the overload flag (ccc equals to 0 or 1);
P the **PEAK** value (ccc – the value in dB);
M the **MAX** value (ccc – the value in dB);
N the **MIN** value (ccc – the value in dB);
S the **SPL** result (ccc – the value in dB);
R the **LEQ** result (ccc – the value in dB).
U the **SEL** result (ccc – the value in dB);
B the **Lden** result (ccc – the value in dB);
Y the **Ltm3** result (ccc – the value in dB);
Z the **Ltm5** result (ccc – the value in dB);
L(nn) the value L of the nn statistics (ccc – the value in dB).

Notice: *The presented above order of the measurement results sent out by the instrument does not depend on the order of the characters sent to the unit.*

Example: After sending to the instrument the string:

#2,1,T?,R?,X50?,V?,P?,L?;

the unit sends out the results of measurement coming from the first profile in predefined, described above, order:

#2,1,T3,V0,P86.9,L74.5,R74.7,X(50)84.9;

Notice: *The value displayed on the screen during the result's presentation is sent out from the instrument in the case when* ***nn*** *is not given after* ***X*** *character.*

Notice: *All bytes of that transmission are ASCII characters.*

A.4. FUNCTION #3 – READ-OUT OF THE MEASUREMENT RESULTS IN 1/1 OCTAVE OR 1/3 OCTAVE MODE

#3 function enables one to read out the current measurement results in **1/1 OCTAVE** or **1/3 OCTAVE** mode.

#3 function format is defined as follows:

#3;

The device responds, sending the last measured spectrum (when the instrument is in STOP state) or currently measured spectrum (when the instrument is in RUN state) in the following format:

#3;<Status Byte> <LSB of the transmission counter> <MSB of the transmission counter> <data byte> (...) <data byte>

Status Byte gives the information about the current state of the instrument.

D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0

where:

D7 = 0 means that "overload does not happen",
= 1 means that “overload appeared”,
D6 = 0 means that "spectrum is not averaged ",
= 1 means that "spectrum is averaged ",
D5 = 0 the instantaneous current result (RUN State),
= 1 the final result (STOP State),
D0 to D4 reserved bits.

Note: *The measurement result is coded in binary form as dB•10 (e.g. 34.5 dB is sent as binary number 345).*

A.5. FUNCTION #4 – READ-OUT OF THE DATA FILE FROM THE INTERNAL FLASH-DISC

#4 function enables the user to read-out the data file from the internal Flash-disc memory. The data file formats are given in Appendix B.

#4 function formats are defined as follows:

#4,0,\; the file containing the catalogue,
#4,0,?; returns the Count of the files and buffers,
#4,0,index,count; the part of the file containing the catalogue,

where:
index - first record,
count - number of records in the catalogue.

#4,1,fname; the file containing the measurement results,
#4,1,fname,?; returns **#4,1,fname,size;**
#4,1,fname,offset,length; the part of the file containing the measurement results,
#4,1<address,length; the part of the file containing the measurement results,

where:
fname - name containing not more than eight-characters,
offset - offset from the beginning of the file,
length - number of bytes to read,
address - absolute internal address,
size - size of the file specified by the **fname**.

#4,2,Bnnn; the file containing the file from the buffer,
#4,2,Bnnn,?; returns **#4,2,Bnnn,size;**

#4,2,Bnnn,offset,length; the part of file containing the file from the buffer,

where:

nnn - the number of the file from the buffer (one or more digits - depends on needs),
offset - offset from the beginning of the file,
length - number of bytes to read,
size - size of the buffer specified by the buffer number.

#4,3; the RAM file,
#4,3,?; returns **#4,3,size;**
#4,3,offset,length; the part of RAM file,

where:

offset - offset from the beginning of the RAM file,
length - number of bytes to read,
size - size of the RAM file.

Notice: *The "\" character is treated as the file name of the catalogue and must be sent to the instrument.*

All data words are sent as **<LSB>,<MSB>**.

When an error is detected in the file specification or data, the instrument will send:

#4,?;

The catalogue of the files is a set of the records containing 16 words (16 bits each). Each record describes one file saved in the instrument's Flash-disc. The record structure is as follows:

words 0 - 3	8 characters of the file name,
word 4	file type (binary number),
word 5	reserved,
word 6	the least significant word of the file size,
word 7	the most significant word of the file size,
words 8 - 15	reserved.

A.6. FUNCTION #5 – STATISTICAL ANALYSIS RESULTS READ-OUT

#5 function enables one to read out the statistical analysis results.

#5 function format is defined as follows:

#5,p;

where:

p the source of the statistical analysis results, for p = 1, 2 or 3 it is the corresponding profile and for p = 0 - the results obtained during **1/1 OCTAVE** or **1/3 OCTAVE** analysis.

The device responds, sending the current classes of the statistics in the following format:

#5,p;<Status Byte> <LSB of the transmission counter> <MSB of the transmission counter> <NofClasses><BottomClass><ClassWidth><Counter of the class> (...) <Counter of the class>

Status Byte gives the information about the current state of the instrument.

D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0

where:

D7 = 0 means that "overload does not happen",
= 1 means that "overload appeared",

D6 = 1 reserved,
D5 = 0 the instantaneous current result (RUN State),
= 1 the final result (STOP State),
D0 to D4 reserved bits.

Notice: *There is not any succeeding transmission in the case when the* ***Status Byte*** *is equal to 0.*

The **transmission counter** is a two-byte word denoting the number of the remaining bytes to be transmitted. Its value is calculated from the formulae:

Transmission counter = 6+n * (4 * the number of the classes in the statistics)

where:

n the number of the transmitted statistics. For p = 1, 2 or 3 only one statistic is transmitted (n = 1). For p = 0 the number of the transmitted statistics depends on the measurement function and
- in the case of **1/1 OCTAVE** analysis n is equal to the number of the analysis results (NOct – cf. App. B) plus the number of the **TOTAL** values for this type of analysis (NOctTot);
- in the case of **1/3 OCTAVE** analysis n is equal to the number of the analysis results (NTer – cf. App. B) plus the number of the **TOTAL** values for this type of analysis (NTerTot).

NofClasses is a two-byte word denoting the number of classes in the statistic.

BottomClass is a two-byte word denoting the lower limit of the first class (*10 dB).

ClassWidth is a two-byte word denoting the width of the class (*10 dB).

Counter of the class is a four-byte word containing the number of the measurements belonging to the current class.

Notice: *The bytes in the words are sent according to the scheme* ***<LSByte>..<MSByte>****.*

A.7. FUNCTION #6 – REMOTE SETTING OF THE USER FILTERS

Function **#6** enables one to send to the instrument the coefficients of the user filters. In the available formats description of **#6** functions the following symbols are used:

type	- 0 for the vibration filters, - 1 for the acoustic filters,
name, **name$_1$**, **name$_2$**	- filter names given by the user,
v	- real type value, expressed in [dB],
first	- integer type value (number of the coefficient in the user filter),
pos	- integer type value (Total value number),
avd	- for the vibration filters: 0 - Acc, 1- Vel, 2 - Dil, - for the acoustic filters this parameter is always equal to 0,
cal	- the calibration coefficient given as the real number expressed in [dB].
chn	- channel number (1, 2, 3 or 4)

#6 function formats are defined as follows:

#6,type,L;

This function returns the list of the defined (existing in the instrument) filters in the following format:
#6,type,n,name$_1$, ... ,name$_n$;

#6,type,W,name,v,v,...,v;

This function sets the coefficients of the new user filter named as **name**. The **name** parameter should be unique (in the instrument there is not any other filter with the same name, otherwise it will be an error). The function answers in the format: **#6;**

#6,type,R,name;

This function returns the coefficients of the user filter named as **name**. If the **name** filter does not exist, an error occurs. The function returns in the following format: **#6,type,n,v_1,v_2, ... ,v_n;**

#6,type,D,name;

This function deletes from the instrument the user filter named as **name**. If the **name** filter does not exist, an error occurs. The function answers in the format: **#6;**

#6,type,S,name,v,v,...,v;

This function sets the user filter named as **name**. If the **name** filter already exists, its coefficients are redefined. If the **name** filter does not exist, the filter is created. The function answers in the format: **#6;**

#6,type,C,name,first,v,v,...,v;

This function sets the coefficients in the user filter named as name starting from the first position. If the **name** filter does not exist, an error occurs. The function answers in the format: **#6;**

#6,type,N, $name_1$, $name_2$;

This function changes the name of the user filter from **$name_1$** to **$name_2$**. The function answers in the format: **#6;**

#6,type,@,chn,L;

This function returns the names of the user filters, assigned to the channel **chn** consecutive **TOTAL** values, in the following format: **#6,type,chn,3,$name_1$,$name_2$,$name_3$;**

#6,type,@,chn,pos,?;

This function returns the description record of the user filter assigned to the **pos TOTAL** value of channel **chn** in the following format: **#6,type,@,chn,pos,name,avd,cal;** (the description record contains: the name of the filter, its type and the calibration coefficient).

#6,type,@,chn,pos,*;

This function recovers the predefined filter for the **pos TOTAL** value of channel **chn** and returns the following format: **#6,type,@,chn,pos,name,avd,cal;**

#6,type,@,chn,pos,name,avd,cal;

This function sets the description record of the user filter assigned to the **pos TOTAL** value of channel **chn** in the following format: **#6,type,@,chn,pos,name,avd,cal;**

The returned parameters: **name**, **avd** and **cal** are set in the description record after the execution of the function. In the case of an error they can differ from the current parameters of the function.

Notice: *In the case of an error all these functions return the following sequence of the characters:* ***#6?;***

A.8. FUNCTION #7 – SPECIAL CONTROL FUNCTIONS

Function **#7** enables the user to perform special control functions. **Some of them should be used with the extreme care.**

#7 function formats are defined as follows:

#7,CB;

This function clears the buffer memory - all buffer files will be deleted. The function returns **#7,CB;** This function is not accepted while the instrument is in the RUN state.

#7,BF;

This function returns buffer memory free space in the format: **#7,BF,ddddd;** (**ddddd** - number of bytes in decimal format).

#7,BN;

This function returns the number of buffer files created to the current time in the format: **#7,BN,ddddd;** (**ddddd** - number of buffer files in decimal format).

#7,RT;

This function returns current real time clock settings in the format: **#7,RT,hh,mm,ss,DD,MM,YYYY;** where **hh:mm:ss** denotes the time and **DD/MM/YYYY** gives the date.

#7,RT,hh,mm,ss,DD,MM,YYYY;

This function sets the current real time clock and returns the following sequence of characters: **#7,RT;**

#7,AS;

This function returns current real time and date settings for the AutoStart function in the format: **#7,AS,e,hh,mm,ss,DD;** where e=1 if AutoStart function is switched ON or 0 if it is switched OFF, **hh:mm:ss** gives the time and **DD** gives the day for the current date.

#7,AS,e,hh,mm,DD;

This function uses the given time and date settings for AutoStart function and returns the following sequence of characters: **#7,AS;**

#7,IC;

Reserved.

#7,SC;

Reserved.

#7,DA;

This function deletes all files (result files and setup files). The function returns **#7,DA;** This function is not accepted while the instrument is in the RUN state.

#7,TP;

This function returns current temperature in the format: **#7,TP,Temperature;**

#7,PR;

This function returns current pressure in the format: **#7,PR,Pressure;**

#7,LP;

Reserved.

#7,BP;

Reserved.

#7,ME;

This function returns the size of internal flash memory in format **#7,ME,FlashMB;**

#7,LS,setup_name;

This function loads setup and writes settings into EEPROM. The selected file must exist. The function returns **#7,LS;**

#7,SS;

This function creates setup file based on the current settings. The function returns **#7,SS;**

#7,HO;

This function enables one to calibrate the SVAN 945A via the Harvest SPE Modems.

#7,CS;

This function clears current setup.

#7,DF;
#7,DF,file_name;
#7,DF,file_name<address;

This function deletes all result files or deletes file specified by **file_name** or internal flash address.

#7,DS;
#7,DS,file_name;
#7,DS,file_name<address;

This function deletes all setup files or deletes file specified by **file_name** or internal flash address.

For the unknown function and/or in the case of the other error, all these functions return the following sequence of characters: **#7,?;**

A.9. FUNCTION #9 – WRITE-IN OF THE DATA FILE INTO THE INTERNAL FLASH-DISC

#9 function enables the user to write-in the data file into the internal Flash-disc memory. The data file formats are given in Appendix B.

#9 function formats are defined as follows:

#4,2,FILE_LENGTH,DATA the setup file

where:

FILE_LENGTH	length of the file in bytes,
DATA	binary content of the file.

A.10. CONTROL SETTING CODES

The control setting codes used in the SVAN 945A instrument (the internal software revision 5.14) are given in the table below.

Table A.1. Control setting codes

Group name	Group code	Code description
Unit type	**U**	U945A (read only)
Serial number	**N**	Nxxxx (read only)
Software version number * 100	**W**	Wxxx xxx – version number (read only)
Microphone polarisation	**V**	V0 - **0 V** V1 - **200 V**
Field correction	**H**	H0 - measurement in free field (**FREE**) H1 - measurement in diffuse field (**DIFFUSE**)
Compensating filter for the microphone	**J**	J0 - switched off (**[ ]**) J1 - switched on (**[√]**)
Calibration factor	**Q**	Qnnnn nnnn-real number with the value of the calibration factor ∈ (-99.9 ÷ 99.9)
Measurement function	**M**	M1 - **SOUND LEVEL METER** M2 - **1/1 OCTAVE analyser** M3 - **1/3 OCTAVE analyser** M5 - **Loudness** M6 - **FFT analyser** M7 - **Tonality** M8 - **RT60** M9 - **Enveloping**
Range	**R**	R1 - **105 dB** (1/1 OCTAVE & 1/3 OCTAVE) R3 - **130 dB** (SLM, 1/1 & 1/3 OCTAVE)
Results displayed on the screen	**P**	P1 - **PROFILE 1** (read only) P2 - **PROFILE 2** (read only) P3 - **PROFILE 3** (read only)
Filter type in profile n	**F**	F1:n **LIN** filter for profile n F2:n **A** filter for profile n F3:n **C** filter for profile n F4:n **G** filter for profile n
Filter type in **1/1 OCTAVE**, **1/3 OCTAVE** or **FFT** analysis	**f**	f0 - **HP** filter f1 - **LIN** filter f2 - **A** filter f3 - **C** filter
Detector type in profile n	**C**	C0:n - **IMPULSE** detector in profile n C1:n - **FAST** detector in profile n C2:n - **SLOW** detector in profile n
Buffer type in profile n	**B**	B0:n - **None** buffer in profile n B1:n - buffer with **PEAK** values in profile n B2:n - buffer with **MAX** values in profile n B3:n - buffer with **MIN** values in profile n B4:n - buffer with **RMS** values in profile n

Storing the results of **1/ OCTAVE** or **1/3 OCTAVE** analysis in buffer's file	**b**	b0 - switched off (**[ ]**) b1 - switched on (**[√]**)
Buffer step	**d**	dnnn nnn number in milliseconds ∈ (**2**, **5**, **10**, **20**, **50**, **100**, **200**, **500**, **1000**) dnns nn number in seconds ∈ (1 ÷ 60) dnnm nn number in minutes ∈ (1 ÷ 60)
Integration time	**D**	Dnns nn number in seconds Dnnm nn number in minutes Dnnh nn number in hours
Repetition of the measurement cycles (RepCycle)	**K**	K0 - infinity (measurement finished by pressing the **<STOP>** push-button or remotely - by sending S0 control code) ..... Knnnn - nnnn number of repetitions ∈ (1 ÷ 1000)
Detector type in the **LEQ** function	**L**	L0 - **LINEAR** L1 - **EXPONENTIAL**
FFT analysis band	**r**	r1 - **FFT** analysis band = **22.4 kHz** r2 - **FFT** analysis band = **11.2 kHz** r3 - **FFT** analysis band = **5.6 kHz** r4 - **FFT** analysis band = **2.8 kHz** r5 - **FFT** analysis band = **1.4 kHz** r6 - **FFT** analysis band = **700 Hz** r7 - **FFT** analysis band = **350 Hz** r8 - **FFT** analysis band = **175 Hz** r9 - **FFT** analysis band = **87.5 Hz**
Window in **FFT** analysis	**w**	w0 - **HANNING** w1 - **RECTANGLE** w2 - **FLAT TOP** w3 - **KAISER BESSEL**
Averaging in **FFT** analysis	**a**	a0 - **LINEAR** a1 - **EXPONENTIAL**
Triggering mode (TriggerMode)	**m**	m0 - switched off (**OFF**) m1 - **SLOPE +** m2 - **SLOPE –** m3 - **LEVEL +** m4 - **LEVEL –** m5 - **BUFFER**
Source of the triggering signal for measurement functions: M1, M6, M7 (TriggerSource)	**s**	s0 - **SPL(1)** – (only one result is available as a source of the triggering signal - the **SPL** measured in the first profile)
Source of the triggering signal for measurement function M2 (TriggerOctSource)	**o**	o0 - **SPL(1**) (**SPL** from the first profile) onn - nn number of the filter in 1/1 OCTAVE spectra ∈ (8 - NOct), respectively: 8 - 125 Hz, 9 -250 Hz, ..., 15 - 16 kHz; Noct = 15 - number of filters in **1/1 OCTAVE** analysis

Source of the triggering signal for measurement function M3 (TriggerTerSource)	**t**	t0 - **SPL(1)** (**SPL** from the first profile) tnn - nn number of the filter in 1/3 OCTAVE spectra ∈ (23 - NTer), respectively: 23 - 125 Hz, 24 - 160 Hz, ..., 45 - 20 kHz; NTer=45 - number of filters in **1/3 OCTAVE** analysis
Triggering level (TriggerLev)	**l**	lnnn - nnn level in dB ∈ (24 ÷ 136)
Number of records taken into account before the fulfilment of the triggering condition (TriggerPre)	**p**	pnn - nn number of records saved in the buffer before the triggering condition; nn ∈ (0 ÷ 50)
Number of records taken into account after the fulfilment of the triggering condition (TriggerPost)	**q**	qnnn - nnn number of records saved in the buffer after the fulfilment of the triggering condition; nn ∈ (0 ÷ 200)
Delay in the start of measurement	**Y**	Ynn nn delay given in seconds ∈ (1 ÷ 59)
State of the instrument (Stop or Start)	**S**	S0 - **STOP** S1 - **START**
Auto Save	**XA**	XA0 - switched off (**[ ]**) XA1 - switched on (**[√]**)
RAM File	**XR**	XR0 - switched off (**[ ]**) XR1 - switched on (**[√]**)
Save Statistics	**XS**	XS0 - switched off (**[ ]**) XS1 - switched on (**[√]**)
Save Max Spectrum	**XM**	XM0 - switched off (**[ ]**) XM1 - switched on (**[√]**)
Save Min Spectrum	**Xm**	Xm0 - switched off (**[ ]**) Xm1 - switched on (**[√]**)