APPENDIX A. REMOTE CONTROL

The remote control of the instrument is possible by means of the RS 232 serial interface.

The RS 232 Interface complies with CCIT V.24 standard, except the connector type in the unit (the LEMO compatible, type FGG.0B.305 is used). Practically all Personal Computers can be linked to the instrument by means of this interface.

The RS232 functions include:
- bi-directional data transmission,
- remote control of the instrument.

The maximum transmission speed is equal to 115200 bits / s.

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

In order to programme the RS 232 interface the user is required to:
1. send "the function code",
2. send an appropriate data file

or

3. receive a data file.

INPUT / OUTPUT TRANSMISSION TYPES

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

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

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

Function #1 enables the user to send the control setting codes to the instrument and read out a file of the current control state. A list of the control setting codes is given in Tab. A.1. The format of #1 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 sends a control settings file for all requests X? in the following format:

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

The following characters should be sent to the instrument in order to read out all current control settings:

#1

The instrument will output a control settings file in the format:
#1,X ccc,X ccc,(...),X ccc;

Example: The following sequence of characters :

#1, U943, N3503, W235, V0, Q0.2, M1, R3, P1, F2:1, F3:2, F3:3, f1, C1:1, C0:2, C2:3, B0:1, B2:2, B4:3, b0, d200, D1s, K5, L0, m0, s0, o1, t1, l50, e480, c1, h1, x2, Y3, S0;

means that the SVAN 943 is investigated (U943), which number is 3503 (N3503). The instrument has the software version number 2.35 (W235), the polarisation of a microphone is 0 V (V0), the calibration factor is equal to 0.2 dB (Q0.2), the Sound Level Meter mode is selected (M1) so the range is 125 dB (R3). 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 **LIN** filter is selected for 1/1 OCTAVE or 1/3 OCTAVE analysis (f1). 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 results of the analysis would be placed in the buffer after each 200 ms (d200). The integration time is equal to 1 second (D1s), the measurement is to be repeated 5 times (K5), the calculations are performed with the linear detector (L0), The triggering is switched off (m0), the source of the triggering signal is the SPL value from the first profile (s0), the source of the triggering for M2 function is the first 1/1 OCTAVE value (o1), the source of the triggering for M3 function is the first 1/3 OCTAVE value (t1), the triggering level is equal to 50 dB (l50). The EXPOSURE TIME in the dosimeter function is equal to 6 hours (e480), 80 dB CRITERION LEVEL is selected (c1), 75 dB TRESHOLD LEVEL is set (h1), the EXCHANGE RATE is equal to 2 (x2). The delay before the start of the measurement is equal to 3 seconds (Y3), the instrument is in the Stop state (S0).

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

FUNCTION #2 – READ-OUT OF THE MEASUREMENT RESULTS IN THE SLM AND THE DOSE METER MODES

Function #2 enables one to read out the current measurement data in the SLM and in the DOSE METER modes.

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

#2 function has a 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 entering the **STOP** condition, **#2** function is no longer active and has to be reprogrammed in order to read-out successive measurements.*

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

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

or

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

The codes of the results for the measurement functions different that the DOSE METER 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** value (ccc – the value in dB);
L the main **LEQ** result (ccc – the value in dB).
U the **SEL** result (ccc – the value in dB);
Q the **Ltm3** result (ccc – the value in dB);
R the **Ltm5** result (ccc – the value in dB);
X(nn) the value L of the nn statistics (ccc – the value in dB).

The codes of the results for the DOSE METER function 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** value (ccc – the value in dB);
D the **DOSE** value (ccc – the value in dB);
d the **D_8h** value (ccc – the value in dB);
A the **LAV** value (ccc – the value in dB);
L the main **LEQ** result (ccc – the value in dB).
U the **SEL** result (ccc – the value in dB);
u the **SEL8** result (ccc – the value in dB);
E the **E** result (ccc – the value in dB);
e the **E_8h** result (ccc – the value in dB);
I the **LEPd** result (ccc – the value in dB); (the big letter "i")
J the **PSEL** result (ccc – the value in dB);
Q the **Ltm3** result (ccc – the value in dB);
R the **Ltm5** result (ccc – the value in dB);
X(nn) the value L of the nn statistics (ccc – the value in dB).

Notice: *The results of the measurement are always sent in the mentioned above order independently of the order of the codes given in #2 function.*

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

Example: After sending to the instrument the following string:

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

the unit may answer as it follows:

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

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

FUNCTION #3 – READ-OUT OF THE MEASUREMENT RESULTS IN 1/1 OCTAVE & 1/3 OCTAVE MODE

Function #3 enables one to read out the current measurement data in **1/1 OCTAVE** & **1/3 OCTAVE** mode.

#3 function format is defined as follows:

#3;

The device responds, sending the last measured spectrum (when in STOP state) or currently measured spectrum (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 informs 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 the overload did not appear,
= 1 means that the overload happened,
D6 = 0 means that the spectrum is not averaged
= 1 means that the 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).*

FUNCTION #4 - READ-OUT OF THE DATA FILE FROM THE INTERNAL FLASH-DISC

Function #4 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,
#4,1,FILE NAME; the file containing the measurement results,
#4,2,Bnnn; the file containing buffer,
where:

FILE NAME max. eight-character name,

nnn the number of the file from the buffer (one or more digits depending on the requirements).

***Notice: The "\" character is the obligatory catalogue file name** (it 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 sends the following set of the characters:

#4,?;

The catalogue of the files is a set of the record 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 character file name,
word 4 file type (binary number),
word 5 reserved,
word 6 least significant word of the file size,
word 7 most significant word of the file size,
words 8 - 15 reserved.

FUNCTION #5 – READ-OUT OF THE STATISTICAL ANALYSIS RESULTS

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

#5 function format is defined as follows:

#5;p;

where:

p - defines the source of the statistical analysis; for p equal to 1, 2 or 3 it is the proper profile and for p equal to 0 it is 1/1 OCTAVE or 1/3 OCTAVE analysis.

The device responds, sending the current 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 informs about the current state of the instrument.

D7	D6	D5	D4	D3	D2	D1	D0

where:

D7 = 0 means that the overload did not appear,
= 1 means that the overload happened,
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-bytes 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 histogramm)

where:

n the number of the transmitted histogramms. For p = 1, 2 or 3 only one histogramm is transmitted (n = 1). For p = 0 the number of the transmitted histogramms 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-bytes word denoting the number of classes in the histogramm.

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

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

Counter of the class is a four-bytes 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>.*

CONTROL SETTING CODES

The control setting codes used in the SVAN 943 instrument (starting from the internal software version 2.35) are given in the table below.

Table A.1. Control setting codes

Group name	Group code	Code description
Unit type	**U**	U943 (read only)
Serial number	**N**	Nxxxx xxxx - the unit's serial number (read only)
Software version number * 100	**W**	Wxxx xxx - version number (read only)
Microphone polarisation	**V**	V0 - **0 V** (read only)
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** M4 - **DOSE METER**
Range	**R**	R1 - **95 dB** (1/1 OCTAVE & 1/3 OCTAVE) R2 - **110 dB** (1/1 OCTAVE & 1/3 OCTAVE) R3 - **125 dB** (SLM, DOSE METER, 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
Filter type in 1/1 OCTAVE or 1/3 OCTAVE analysis	**f**	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, the number in miliseconds ∈(**10**, **20**, **50**, **100**, **200**, **500**, **1000**) dnnns - nnn, the number in seconds ∈(1÷60) dnnnm -nnn, the number in minutes ∈(1÷60)
Integration time	**D**	Dnns nn, the number in seconds Dnnm nn, the number in minutes Dnnh nn, the number in hours
Auto repeat mode (RepCycle)	**K**	K0 - infinity, the measurement stops after pressing **<STOP>** push-button or after receiving the S0 setting .... Knn - nn, number of the repetition ∈(1÷1000)
Detector type in the **LEQ** function	**L**	L0 - **LINEAR** L1 - **EXPONENTIAL**
Trigger mode	**m**	m0 - switched off m1 - **SLOPE +** m2 - **SLOPE -** m3 - **LEVEL +** m4 - **LEVEL -**
Source of the triggering signal for M1 and M4 functions (TriggerSource)	**s**	s0 - **SPL(1)**; only one existing possibility is the SPL value from the first profile
Source of the triggering signal for M2 function (TriggerOctSource)	**o**	onn - nn, the number of 1/1 OCTAVE value ∈(1÷NOct+NOctTot)
Source of the triggering signal for M2 function (TriggerTerSource)	**t**	tnn - nn, the number of 1/3 OCTAVE value ∈(1÷NTer+NTerTot)
Exposure Time in **DOSE METER** mode	**e**	enn nn, the number in minutes ∈(1÷480)
Criterion Level in **DOSE METER** mode	**c**	c1 - **80 dB** c2 - **84 dB** c3 - **85 dB** c4 - **90 dB**

Threshold level in **DOSE METER** mode	**h**	h0 - none h1 - **75 dB** h2 - **80 dB** h3 - **85 dB** h4 - **90 dB**
Exchange rate in **DOSE METER** mode	**x**	xnn - nn, the integer number ∈ (2÷5)
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**