User guide

Control program for the controller SMS60 (Visual C++ 5.0 / Win32 application/ C++ compiler)

Important !
Before you put the system with the help of this guidance into operation, please read the operating instruction for the step motor controller SMS60.

Software

The software is an extracting file on the diskette. After unpacking the file, files will be copied on your disk into the directory "C:\OWIS\SMS60\Win32". There is no setup program and you do not need to install anything.
The files are stored in 4 folders:
demo\Application, *demo\Vc++*, *Samples\Delphi* and *Samples\Vb*.
In the folder “Application” you will find the necessary files to start the control program, among other things sms60.dll. The DLL contains all functions, which permit communication with SMS60 (COM and GPIB interfaces) and the motor controller. It uses Win32API functions and drivers of National Instruments, which are applicable under Win9x, WinNT, Win2000 and WinXP. If you use the GPIB interface, you must install the appropriate GPIB drivers and the GPIB board on your computer.
Please note, you need a special cable for the controller connection to a PC. One can order the GPIB-cable by National Instruments and the serial cable can be ordered by OWIS, it is also possible to build it by your self. One will find the pinning in the file „readme.txt“.
In the directory “Vc++” is the source code of the control program. Here it is shown how one can define the functions (in a C/C++ program) and how one can use it. In the directories “Delphi” and “Vb” are example programs, which shows using of the functions from the DLL in Delphi and Visual Basic and their declarations.
The program was written with the resolution of 1024x768 pixel in 24Bit depth of shade and tested under Win9x, WinNT, Win2000 and WinXP. We ask you to select these adjustments for optimal operability of the graphic card. To test the program you let run the file *SMS60.exe* from folder “Application”.

Program logon

Constituents

The program consists of 2 files (*Application*). Those are:

- SMS60.exe - the main application to control your motor;
- sms60.dll - the DLL, which provides functions for the control.

The user surfaces

You will deal mainly with three different surfaces (Menu *View*): ”SMS60 control“,”Axis parameters“ and ”Protocol”. The first window is needed for positioning, with the second one can read and set the axis parameters and in the last window you will see the protocol.

When you start the program, there the dialog “Set interface” will appear (it is able to switch it off if not needed) where you can define the interface.
The menu Extras offers you additional opportunities:

1. Read and set the interface values (submenu *Interface*).
2. One can set pitch, full steps per revolution and gear reduction for each axis, which is necessary for positioning in mm or degree (submenu *Stage attributes*).
3. To read version number of the firmware (submenu *Firmware*).
4. To read state information of the controller (submenu *Sysinfo*).
5. To read and change limit switch configuration for each single axis (submenu *Limit switches*).
6. To read and set linear speed and rpm for each single axis, but one should set first stage attributes (submenu *Speed values*).
7. To sent commands from the SMS60 order list to the controller (submenu *Low level test*).
8. To test joystick mode (submenu *Joystick*).
9. To read and set axis encoder position (submenu *Encoder*).
10. To activate and deactivate a controller keyboard (submenu *Keyboard*).
11. To create(open) and close a protocol file (submenu *Protocol file*).

The menu *Move* contains two dialogs, which allows positioning in a 1..3 dimensional grid: *Zigzag* and *Meander*.
The menu “*?*” contains the submenu *Info*.. with information about the program version.
You will find all surfaces in the appendix (Fig.1-11).

Functions
The functions (SMS60*) are intended for controlling. They are in the file “sms60.h” declared. The file “SMS60func.hlp” has to everyone a detailed description. Other functions are declared in the files “Ieee.h”, “Comm.h”. All are implemented in the Dll “sms60.dll”.

Programming flowchart

Start program

Start the file *sms60.exe* from the directory “Application”. First the dialog “Set interface” will appear where you can define the interface. It is able to switch off if not needed (Check box “show window..”).
After dialog closing one can operate with the first view “SMS60 control”.

How to operate with the view "SMS60 control".

The window divided into 3 different areas.

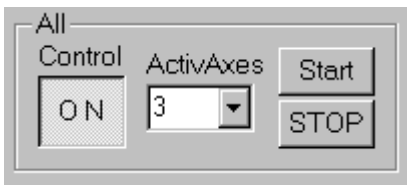

Fig.1

The 1.Part (s.Fig.1) is intended for control of all axes:

Button **Control**	- switch all axes On or Off (default: On)
Combo **ActivAxes**	- set the number (n) of active axes (from 1 to n)
Button **Start**	- start all active axes (go to position)
Button **STOP**	- stop all engines

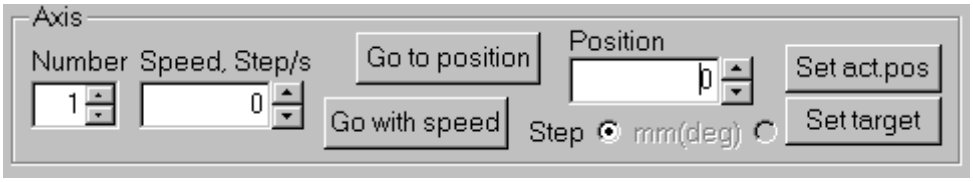

Fig.2

The 2.Part (s.Fig.2) is intended for control of one axis:

Spin button **Number**	- select motor to be controlled
Text box **Speed**	- select new speed value
Button **Go with speed**	- start drive with constant speed for the selected motor (spin button *Number*)
Button **Go to position**	- start drive to target position for the selected motor (spin button *Number*)
Text box **Position**	- select new position value
Button **Set act.pos**	- set current position for the selected motor (spin button *Number*)
Button **Set target**	- set target position for the selected motor (spin button *Number*)
Radio buttons **Step** and **mm(deg)**	- define unit for positioning, before it's necessary to set stage attributes (submenu *Stage attributes*)

Fig.3

The 3.Part (Fig.3) is intended for the individual axes (motors):

Button **Axis1**	- switch motor On or Off (default: On)
Button **Go home**	- drive to reference limit switch
Combo **Posmode**	- set positioning mode (relative, absolute)
Text box **PosAct**	- display current motor position
Text box **Target**	- display target position of the motor
Text box **Vact**	- display current speed of the motor
Button **Switch free**	- drive free from limit switch
Button **Stop**	- stop motor

How to operate with the view "Axis parameters".

The axis parameters for the selected motor (spin button *Number*) will be displayed.

Frequency

Text box - display and select frequency

! Alternative one can set it in the dialog "Speed values".

Free frequency

Text box - display and select drive frequency from limit switch

Lock frequency

Text box - display and select drive frequency to limit switch

Acceleration

Text box - display and select acceleration (in internal controller units from 1 to 8191)

Phase current reduction

Text box	- display and select phase current reduction (in %)
Check box	- display state of phase current reduction
Check box **Reference..**	- indicate, if the axis has done a valid reference motion already
Button **Set**	- set last changed axis parameter

How to operate with the dialog „Stage attributes“ (submenu *Stage attributes*).
Please select a positioning unit. After that the stage attributes will be updated. Select the axis number and click the button *Set* to set values. With the button *Close* one can close the dialog.

How to operate with the dialog „Sysinfo“ (submenu *Sysinfo*).
The state information of the controller will be displayed.

Controller state

Text box	- display state byte value
Button **?**	- display dialog with the detailed information

Stop state

Text box	- display stop state value
Button **?**	- display message box with the detailed information

Reference state

Text box	- display reference state value
Button **?**	- display message box with the detailed information
Button **Reset**	- set controller in the start state
Button **Master reset**	- set controller in the factory state, all parameters will be set to default
Button **Close**	- terminate dialog

How to operate with the dialog „Limit switches“ (submenu *Limit switches*).
The limit switch configuration for the selected axis (spin button *Number*) will be displayed.

Configuration

Check box **MINSTOP** etc.	- define corresponding limit switch of the axis (available/ not available)
Check box **Low, High**	- define limit switch mask of the axis (polarity: high/ low active)

State

Check box **MINSTOP** etc.	- display state of the corresponding limit switch of the axis (activated/ not activated)
Text box **Limit switch..**	- display limit switch hysteresis value
Button **Save config**	- set limit switch configuration of the axis
Button **Close**	- terminate dialog

How to operate with the dialog „Joystick control“ (submenu *Joystick*).
One can test joystick mode.

axis X

Check box **1..9**	- select axis X for joystick positioning
Text box **PosAct**	- display current motor position of the axis X
Text box **Fact**	- display current speed of the axis X
Text box **JoyF**	- display and select speed of the axis X

axis Y

Check box **1..9**	- select axis Y for joystick positioning
Text box **PosAct**	- display current motor position of the axis Y
Text box **Fact**	- display current speed of the axis Y
Text box **JoyF**	- display and select speed of the axis Y

X direction

Check box	- display and set direction of the axis X for joystick positioning

Y direction

Check box	- display and set direction of the axis Y for joystick positioning
Button **Joystick Off(On)**	- switch joystick mode on or off
Button **Set joystick axes**	- set axes for joystick positioning
Button **Set joystick freq.**	- set last changed axis speed
Button **Close**	- terminate dialog

How to operate with the dialogs „Move zigzag“ and „Move meander“ (menu *Move*, submenu *Zigzag* and *Meander*).
With the spin buttons *AxisNr* one defines axes for positioning. The values must not be equal (for example: x=1, y=2, z=3 – true; x=y=z=1 – false).
With the spin buttons *StepNumber* one defines a number of the steps for positioning. The value (=0) means this axis will be ignored during positioning.
With the spin buttons *StepLength* one defines a step length the for the corresponding axis (mm or degrees).
The value *SleepTime* defines a time-out at any point of the grid (0...N ms).
With the button *Start* one starts a positioning. With the button *Stop* one breaks a positioning at any time. With the button *Close* one can close the dialog.

Appendix

Figure 1. „SMS60 control“

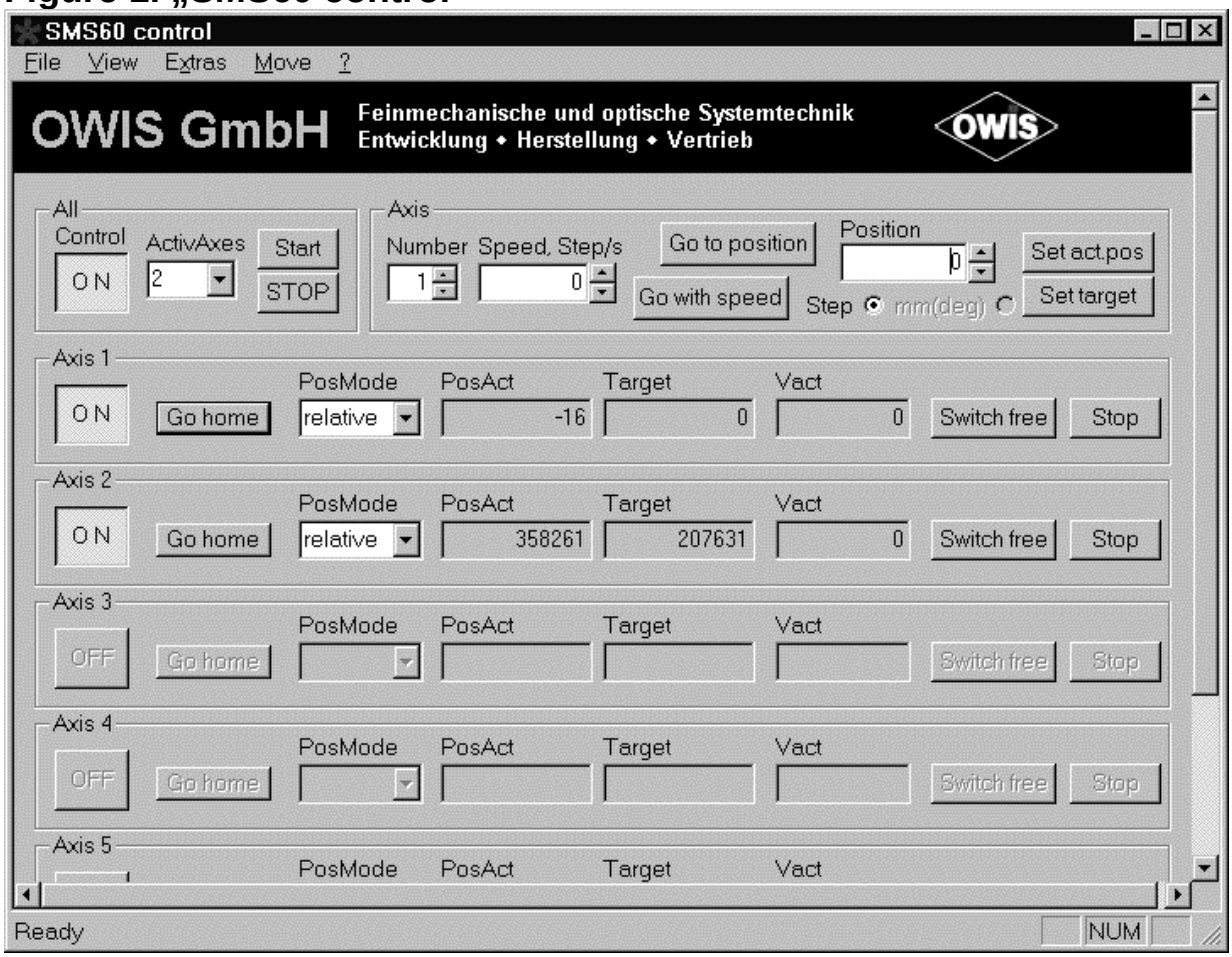

Figure 2.1. Interface dialog „serial interface“

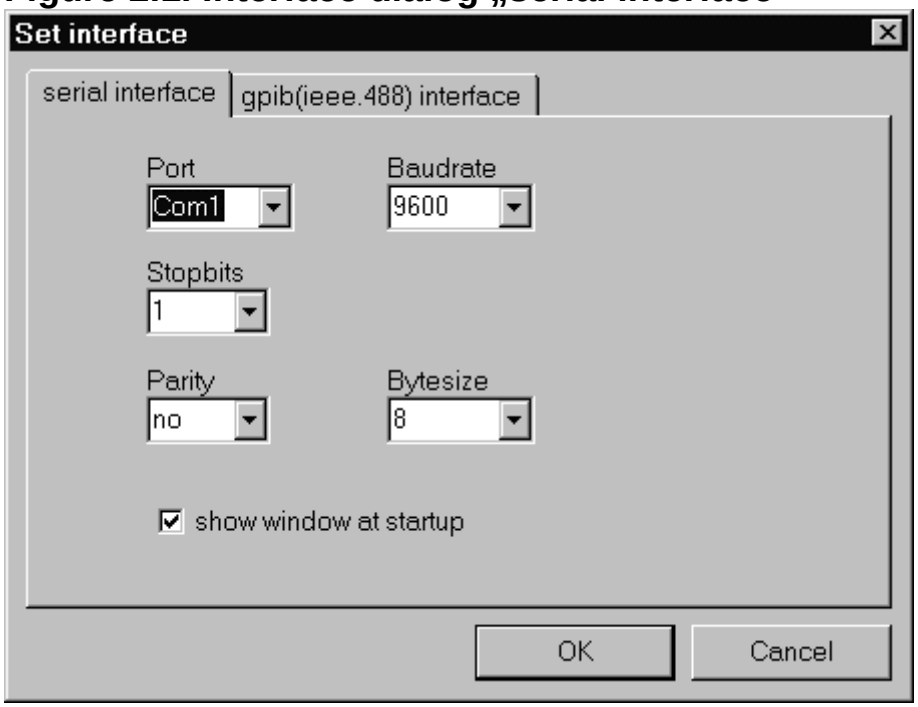

Figure 2.2. Interface dialog „GPIB interface“

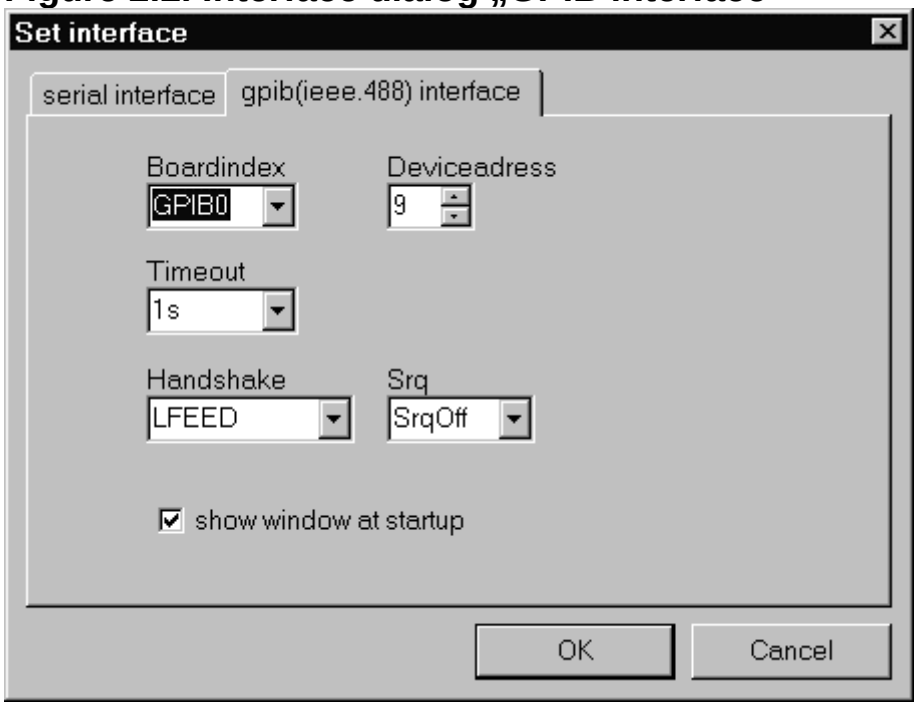

Figure 3. „Axis parameters”

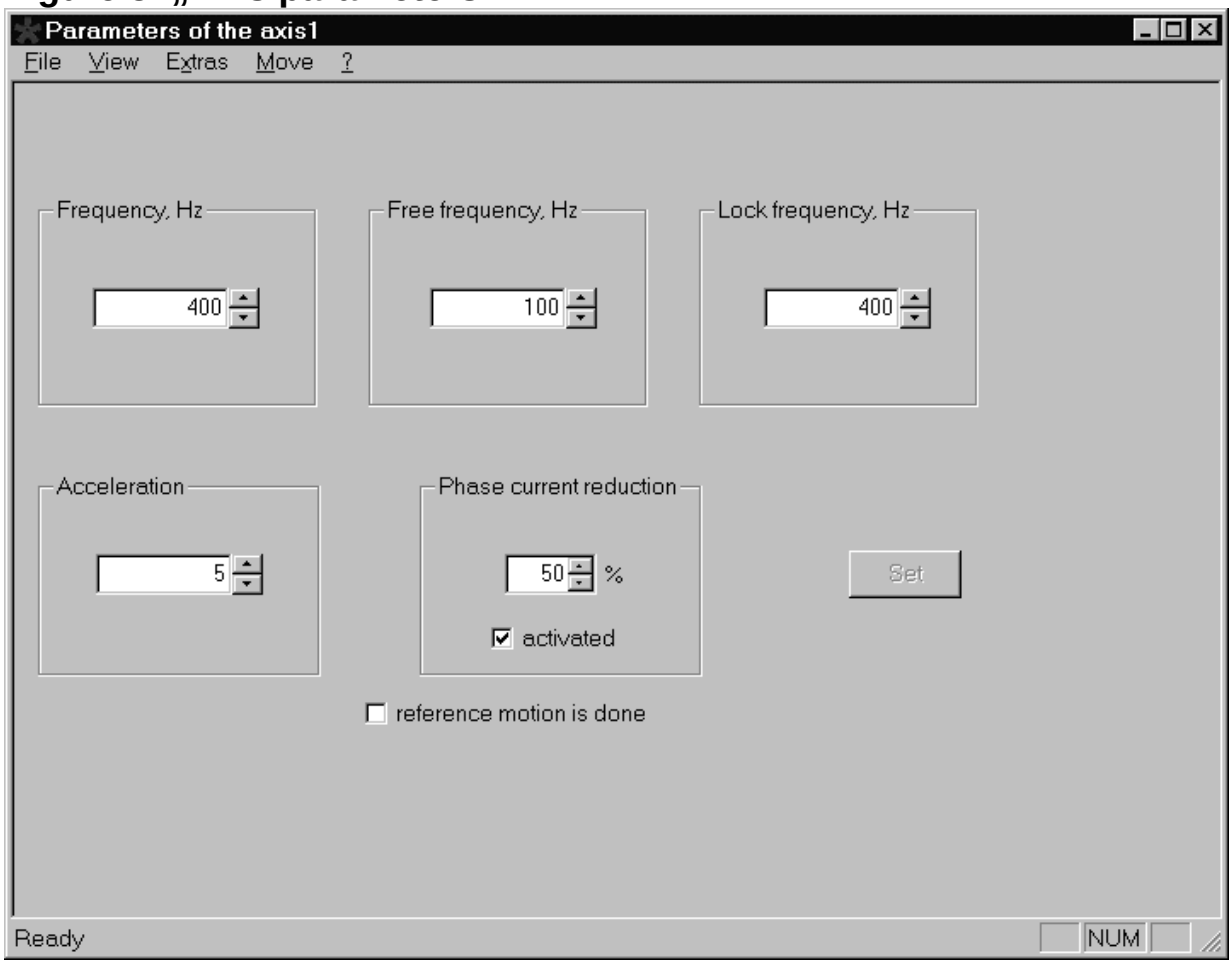

Figure 4. „Stage attributes”

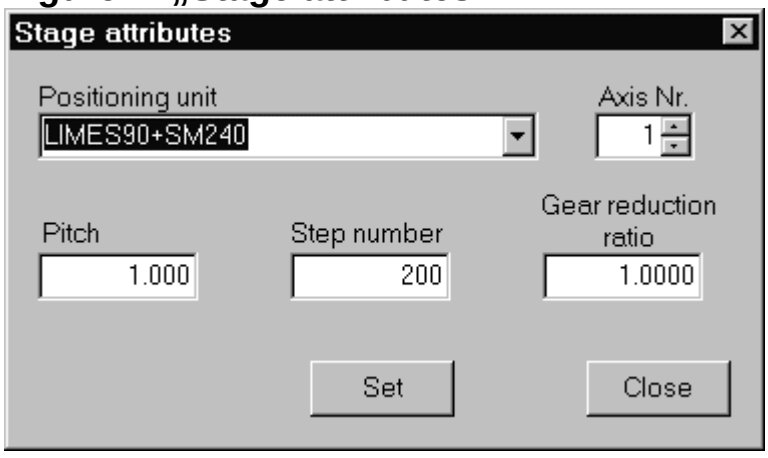

Figure 5. „Communication's protocol“

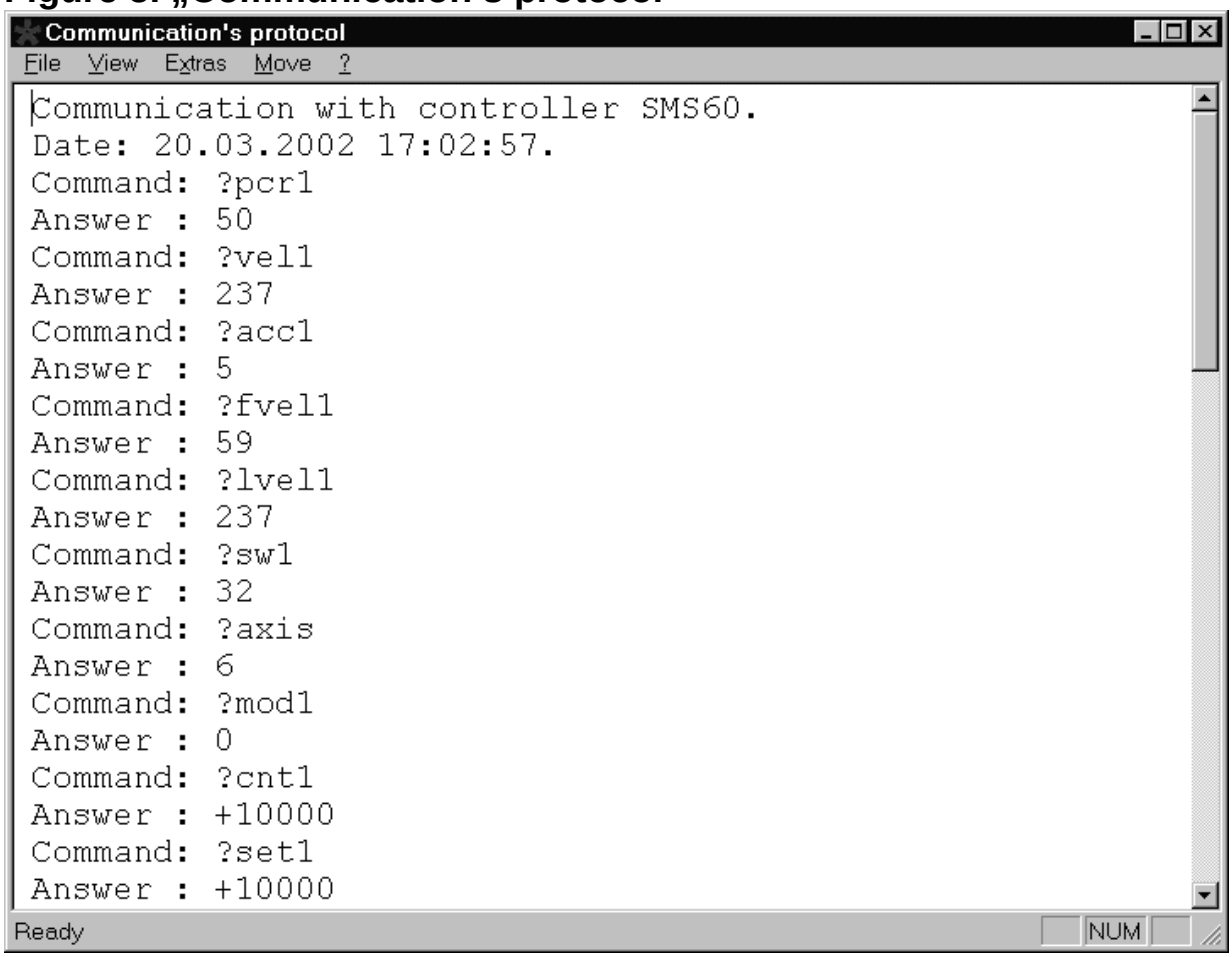

Figure 6. „Sysinfo”

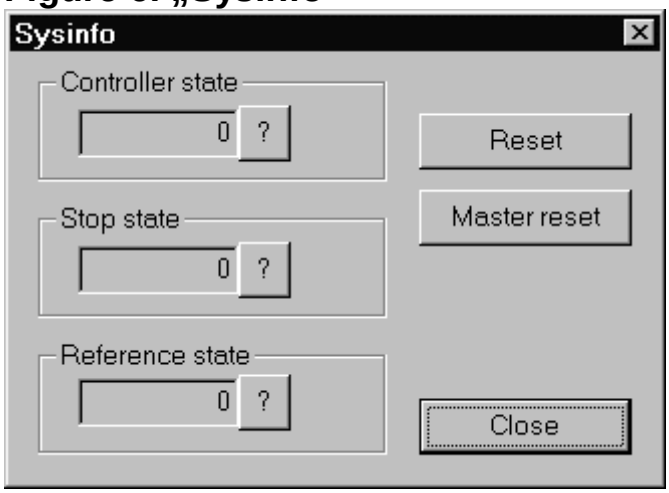

Figure 7. „Speed values”

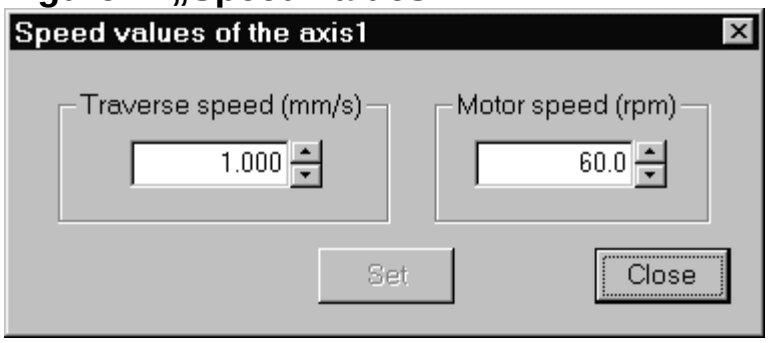

Figure 8. „Joystick control”

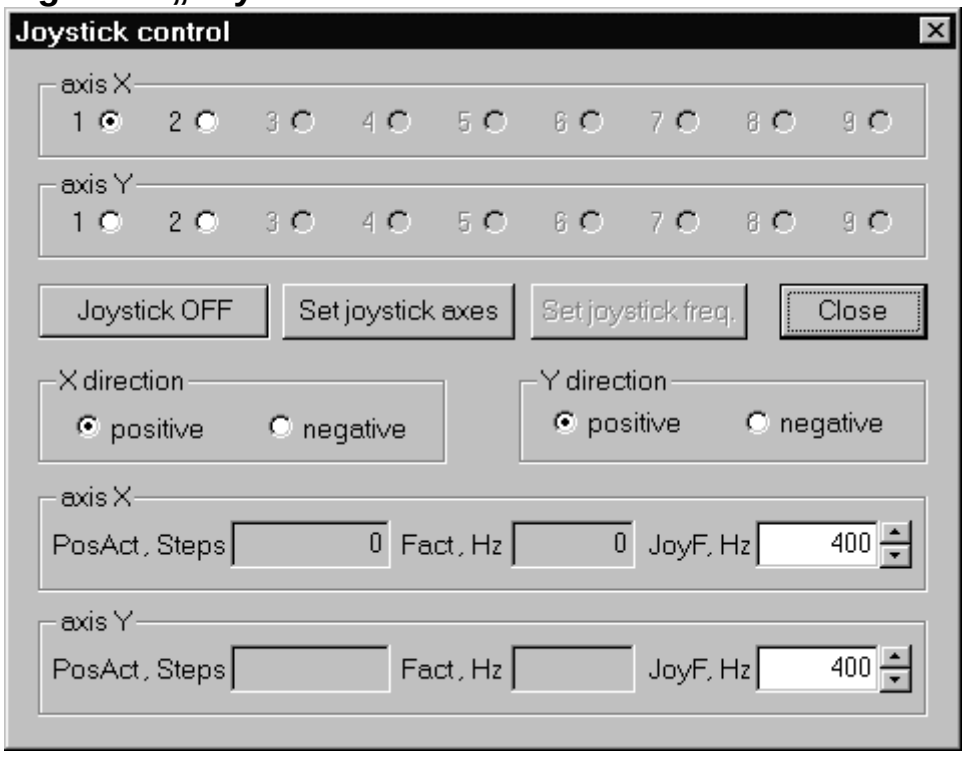

Figure 9. „Limit switches”

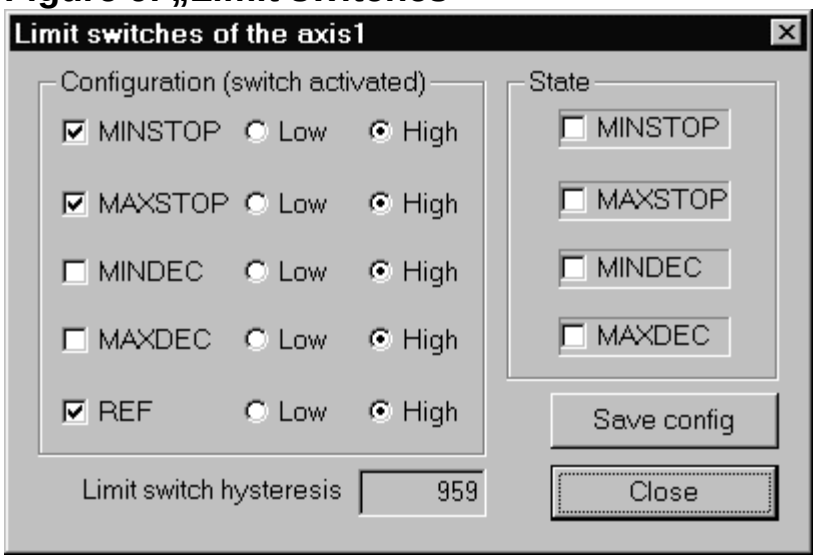

Figure 10. „Move zigzag”

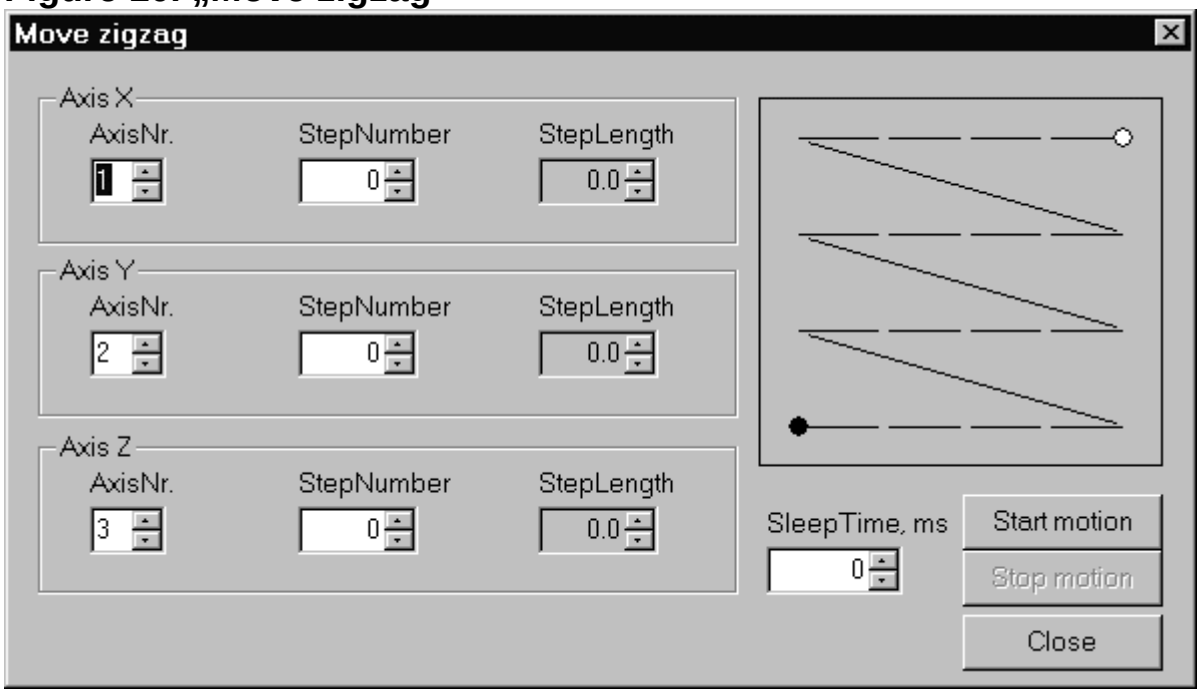

Figure 11. „Move meander”