MOVIDYN®
AC Servo Controller

PC User Interface MD_SHELL
User Manual

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SEW EURODRIVE

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1. Introduction

With the introduction of the new SEW servo controller series MOVIDYN® the user is also provided with a PC user interface to facilitate parameter setting and control of the MOVIDYN® units.

MD_SHELL allows for up to 60 drive units to be connected to a PC. This is possible because the parameter windows opened in the program can be assigned to any of these units.

Due to our use of an SAA toolbox for writing the program, the MD_SHELL user interface has the features which are characteristic for a professional interface among them, for example, pull-down menus and window technique, use of keyboard and/or mouse and the integrated on-line help utility. Many windows can be adjusted in size and on-screen location to suit your personal preferences.

If you are already familiar with our MC_SHELL software for the MOVITRAC® 3000/3100 frequency inverter series, you will find that the MD_SHELL user interface is similar to use. In designing our software programs we take great care to keep new programs in line with existing ones, in particular with regard to on-screen presentation and user guidance to make it easier for you to familiarize yourself with, switch over to and use the new program. Any suggestions for improvement will be gratefully received, with a view to their inclusion in a future program update. Should you encounter any problems when working with the program, please do not hesitate to contact us.

2. Installation

2.1 Hardware requirements

- PC / AT with an 80286 or higher microprocessor
- minimum 640K of available memory (RAM)
- 3.5" or 5.25" disk drive
- VGA compatible video adapter (colour or monochrome, LCD)
- hard disk
- minimum one serial RS-232 interface to connect the drive unit to the AC servo controller
- further serial interface to connect the mouse

To connect the MOVIDYN® to a PC, a standard serial interface cable with a maximum length of 6m is required (9-pin type D plug to 9-pin type D socket).

Assignment, 9-pin cable Cable side:	**RXD** Receive data	**TXD** Transmit data	**DTR** Data terminal ready (transmit/receive changeover)	**Ground**
9-pin connector (MOVIDYN® side)	PIN 2	PIN 3	PIN 4	PIN 5
9-pin socket (PC-COM1 side)	PIN 2	PIN 3	PIN 4	PIN 5

Pin assignment of the interface cable, PC side:

Assignment, 9/25-pin cable	**RXD** Receive data	**TXD** Transmit data	**DTR** Data terminal ready (transmit/receive changeover)	**Ground**
9-pin connector (MOVIDYN ® side)	PIN 2	PIN 3	PIN 4	PIN 5
25-pin socket (PC-COM1 side)	PIN 3	PIN 2	PIN 20	PIN 7

When using a 9- to 25-pin adapter:

CAUTION:

When connecting PC and drive unit make sure the supply voltage is switched off!

2.2 Installing the program on your PC

On the enclosed diskette you will find an installation program which copies all the required files to your PC.

Insert the diskette into the drive (e.g. A:), type A: and press the RETURN key to change to this drive. Then start the INSTALL.BAT program:

Change drive:
Display: **C:\>** Input: **A:** RETURN Key
Start program:
Input: **A:\INSTALL C:\SERVO** RETURN Key

INSTALL.BAT will require you to specifiy a directory where you want to have the MD_SHELL files copied to. If the specified directory does not exist yet, the program will automatically create it for you. In the above example all files are copied to the directory SERVO which was created on the C drive.

After successful installation you will find the following files on your hard disk:

INSTALL.BAT	Installation batch file
MD_SHELL.EXE	Main program file
ALLASCII.TXT	File with different character sets
MD_SHELL.INI	MD_SHELL initialization file
MD.PAR	Parameter file with factory-set parameters
DEUTSCH.LNG	Text file for the GERMAN language version

further *.LNG files for other languages if required.

The files take up approx. 600 KByte of storage space on your hard disk. To operate the program all program files must be located in the same directory on your PC.

2.3 Starting the program

To start the program type MD_SHELL and press <RETURN> to confirm. You start MD_SHELL from the directory that contains your MD_SHELL program files.

EXAMPLE: Actual directory: **C:\SERVO>** Input: **MD_SHELL** RETURN Key

MD_SHELL may also be started from another directory. In that case enter the complete path name.

EXAMPLE: Actual directory: **C:\DOS>** Input: **C:\SERVO\MD_SHELL** RETURN Key

If the program is started for the first time, then the language selection window (refer to section 4.4.1) appears, then select the desired language. The necessary settings will be stored upon ending the program.

During program operation MD_SHELL saves different program settings such as the language or colour palette selected in special parameter files, e.g. MD_SHELL.INI. Normally, these files will be located in the same directory as MD_SHELL.EXE.

Note:
If possible avoi from another program (such as PCSHELL, DOSSHELL etc.) in order to have as much memory capacity available for MD_SHELL as possible.

Program operation from the keyboard and using the mouse

When you start MD_SHELL you will be given a "clean" screen to work from. The top line contains the main menu bar. If you are using a mouse, move the mouse pointer to the title you want to choose and click the left mouse button to display the associated pull-down menu. Point to the item of your choice and click the left mouse button to select it.

If you are using the keyboard, press the <ALT> key and one of the coloured mnemonic letters in the menu bar. Use the cursor keys to move the selection bar and highlight the menu item you want, then press <RETURN> to confirm your selection or type the mnemonic letter (displayed in a different colour) of the respective menu item.

Conventions used in this manual:

To ensure unity of form the following conventions have been used in this manual:

1. Keys to operate are enclosed in pointed brackets:
   <RETURN>, <F1>, <ESC>, etc.

2. Button controls in windows which can be operated with the mouse are displayed in brackets:
   [ESC], [F1], [INS], etc.

3. Menu items are separated by a slash and italicized together with the menu title:
   "***Environment/End" or "Options/Clock"*** etc.

2.4 Communication requirements

If the PC and MOVIDYN® have failed to connect or if the established communications link is faulty, the windows on your screen, which will normally display the parameters, will only show dashes ("—") instead of the expected values. If you have a faulty connection or none at all, please check the following:

2.4.1 Interface cable

The RS-232 interface cable has a 9-pin type D socket which connects to the PC and a 9-pin type D plug which connects to the MOVIDYN® servo controller. The cable has a minimum of 4 cores, connecting pins 2, 3, 4 and 5 of the plug and the socket. The cable should not be longer than 6m.

2.4.2 PC interface

Make sure that the cable is connected to the correct COM port of your PC.

2,4.3 Interface selection

Check whether the “PC interface” and “Servo controller interface” settings in the “Interfaces” menu item actually reflect your hardware configuration.

2.4.4 Communication address

When you use the RS-232 or RS-485 interfaces of the power supply module (MPx) for communication, you must set the axis module addresses. Make sure that the address set in menu item “Interfaces” corresponds to the actual axis module address. To verify the axis module address, briefly press the S1 button on the axis module. On the 7-segment display an “A” will start flashing followed by - ten’s - unit’s places (e.g. “A” - “1" - ”9" = axis module 19). In a network setup an address may only be assigned once otherwise a collision of data on the transmission line would occur, resulting in a faulted connection. If you use the RS-232 interface (PC connection) of the AIO11 option pcb, it is not necessary that you set the axis address. The unit can be addressed under any address.

If, however, you use any of the other RS-485 or RS-232 interfaces, which are available on the basic unit or on the FIS31 option pcb, it is absolutely necessary to set the communication address.

2.4.5 RS-485 Connection

Upon connection of the RS-485 interface of the power supply modules (MP ..., MPB 51 ..., MPR 51...) or the compact servo controllers (MKS 51 ...) verify that the correct ends of both RS-485 leads are connected.

2.4.6 RS-232 Connection

An RS-232 connection is included with MP 50 ... and MPB 51 ... power supply modules as standard. The MPR 51 ... power supply module and MKS 51 ... Compact Servo Controllers require either the FIS 31 option or the new USS 11A.

Both are functionally fully identical in respect to operation with MD_SHELL.

2.4.7 Windows DOS-Shell

MC_SHELL should not be started under the Windows DOS-Shell. Doing so can lead to possible problems with the serial interface and thus does not provide reliable program execution.

3. The special parameter files of MD_SHELL

To operate correctly MD_SHELL requires some additional files, where, for example, important program settings are stored. When the program is started, these files are read in, processed and partly saved again.

Note:

The following files are created automatically by MD_SHELL and normally do not need to be changed. Only in exceptional cases (i.e. abnormal termination of MD_SHELL) or if the application requires so, should you modify these files.

Nevertheless, this section will deal with these files to give you an idea of the features offered by MD_SHELL.

3.1 The MD_SHELL.INI file

This file contains all settings carried out by you during program execution. The file is saved in ASCII format and can be edited with most text editors. Upon program start the data are loaded and at the end saved back again. If you wish to change certain presettings prior to loading the program, all you need to do is enter the corresponding data in this file. The parameters in this file are arranged in lines. The line structure is the same for each line and must not be changed under any circumstances.

Example: **ColorSet=3**

The identifier of a setting value is to the left of the '=' character, the parameter's value to the right. In the above example colour palette 3 is set upon program start. The individual parameters have the following meaning:

[User]

This line indicates that the following parameters are to be set by the user.

Control=*x*

Determines the programs control mode. x may be replaced by the following values:
0 : no servo controller connected
1 : servo controller connected on COM1
2 : servo controller connected on COM2
3 : servo controller connected on COM3
4 : servo controller connected on COM4
If this line is missing or the value invalid, 0 is entered.

Language=*'name'*

Here the language is entered. 'name' stands for the name of the text file with the respective language (e.g. DEUTSCH.LNG). If this line is missing or the name invalid the file name DEUTSCH.LNG is entered.

Beep=x

x=0 turns the beep off, x=1 turns it on.

ColorSet=x
The set colour pallete is=x. Permissible values for x are 0 to 5. If this line is missing or the value invalid, 0 is entered.

User menu=*'name'*
MD_SHELL gives you the option to create your own menu window, the so-called abridged menu, containing selected parameters. If you want to create several such menus, enter the corresponding file name instead of 'name'. If the specified name does not exist or no name is entered, the MD_USER.MNU file will be loaded as default file.

Desktop=*'name'*
This line identifies the name of the desktop file, which, for example, contains the colour settings for the complete program. The default setting for 'name' is MD_WIN.DAT.

Address=x
Here the address for the active servo controller is entered. All windows, which are opened during program operation, are assigned the address entered here. After program start a change of address can be effected via menu option *"Connection/Amplifier address". x* is replaced by an address between 0 and 63. At the end of the program the address of the unit last activated is entered here.

AutoConfig=x
This parameter indicates whether the autoconfiguration mode is switched on (x=1) or off (x=0). If x=1 the MD_SHELL.CFG file is loaded upon program start and the screen configuration saved in this file displayed (please refer to section 4.5.4).

VioCols=x
Parameter x specifies the number of columns displayed on the screen. The only value accepted is 80!

VioRows=x
Parameter x specifies the number of lines displayed on the screen. You may enter 25 or 50 here (please refer to section 4.4.5).

DTR=x
Parameter x specifies the type of connection between the PC and the supply module of the SERVO drive. x=1 indicates an RS-232 connection, x=0 an RS-485 connection between the PC and the mains modules of the drive. For further details please refer to sections 2.4 and 4.3.2.

MD_SCOPE=*'path'*
The parameter 'path' specifies in which directory on your hard disk you have installed the MD_SCOPE program. Selecting menu option *"Environment/MD_SCOPE"* (please refer to section 4.1.5) will take you out of MD_SHELL and activate MD_SCOPE in the *'path'* directory. If *'path'* and/or MD_SCOPE do not exist, MD_SHELL is exited as usual.

MD_POS=*'path'*
The parameter *'path'* specifies in which directory the MD_POS program (programming interface for API/APA positioning p.c.b. is located. Selecting menu option *"Environment/MD_POS"* (please refer to section 4.1.6) will take you out of MD_SHELL and call up MD_POS in the *'path'* directory. If *'path'* and/or MD_POS do not exist, MD_SHELL is exited as usual.

3.2 The MD_WIN.DAT file

This file contains all the program colour settings. If, e.g., you choose to change the programs blue background colour, this change is saved in the MD_WIN.DAT file.

3.3 The MD_SHELL.CFG file

This file contains the screen configuration as saved. If the autoconfiguration feature is activated, the file is read up on program start and the configuration saved displayed.

3.4 The MD_USER.MNU file

This file contains the set user menu, which is retained when you exit MD_SHELL.

4. The menu features

The following section deals with MD_SHELL's different menu features. Each individual feature will be discussed both in the way it works and the way it is presented on the screen. Some menu features allow you to open a window. How you manipulate this window is explained under the heading "General description", which also describes the way the key fields work and the effect certain keys have. The following characteristics are explained for each window:

1.	Type: System window	
2.	Height	–
3.	Move	X
4.	Deactivate	X
5.	Edit contents	–
6.	Update	–
7.	Assign address	–

An 'x' indicates that the window reviewed possesses that characteristic.

re. **1)**

The window type (system or application window) determines the number of windows that can be opened. MD_SHELL allows the user to open a maximum of 15 windows (10 application windows + 5 system windows). The system windows are not identified by a window number in the lower left corner of the window. Also, they are of a modal nature, i.e. they remain open until the user has taken a decision.

re. **2)**

Indicates whether the window can be height adjusted using the mouse or via the keyboard. Windows that have this attribute, are identified by a height adjust symbol in the lower right corner of the window.

re. **3)**

Indicates whether a window can be moved using the mouse or via keyboard. Nearly all windows can be moved.

re. **4)**

Deactivating a window means activating another window by clicking the mouse button (or the F6 key). The settings affected in these windows may therefore not be of prime importance for program control, which generally only applies to application windows.

re. **5)**

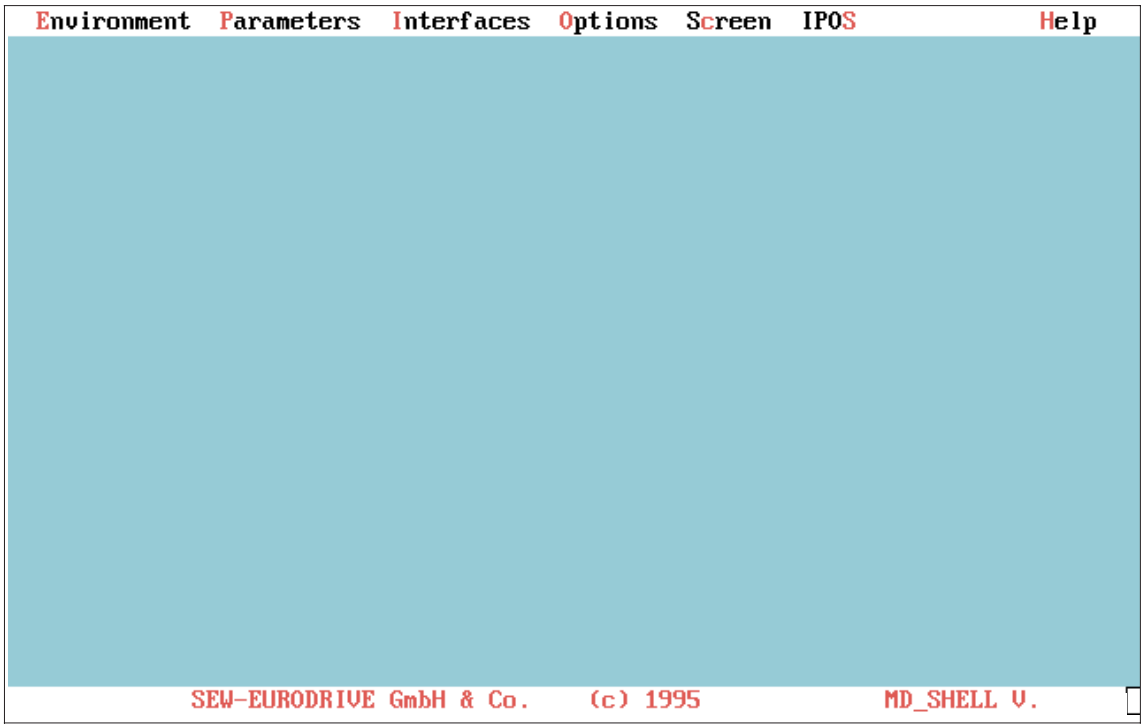
Windows with this characteristic give you the opportunity to enter text (e.g. file names) or figures (e.g. parameter values) directly or to change set values in a different way (e.g. using cursor keys).

re. **6)**

Windows with this characteristic are continuously updated. Therefore the contents of these windows are always up-to-date. This way process data of different drive units can be visualized on the screen at the same time.

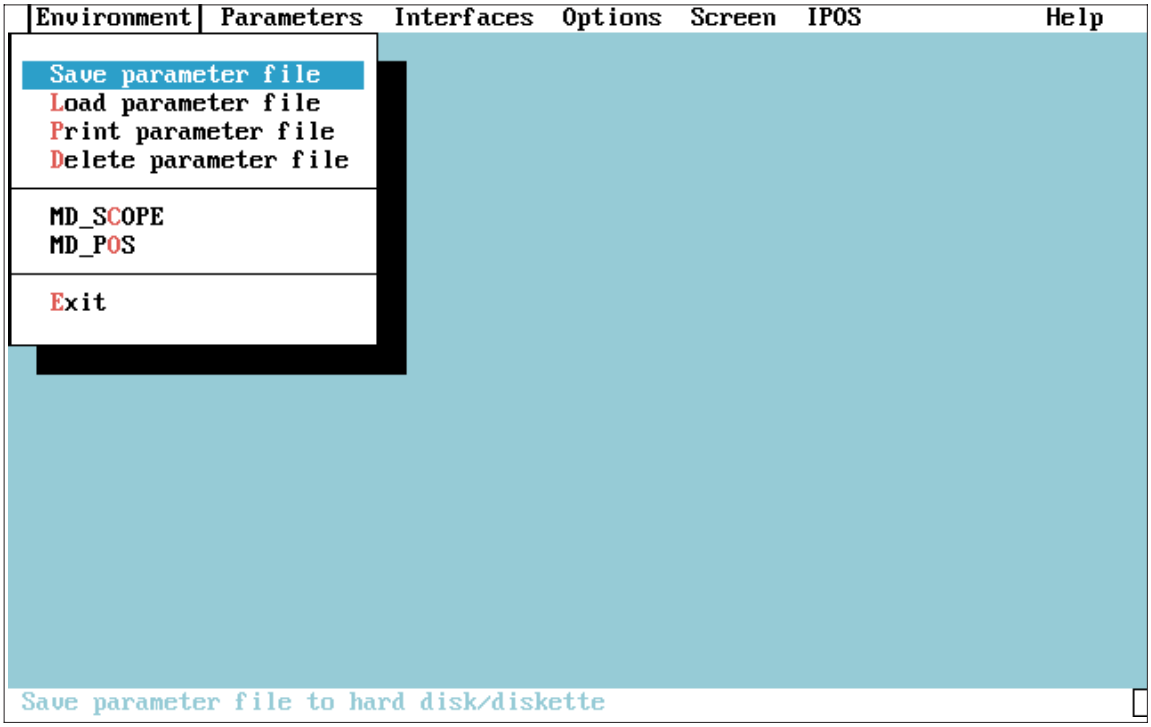
re. **7)**

Windows showing the parameters of one unit are address related, i.e. each of these windows can be assigned to any drive unit. The address is displayed in the upper left corner of the window. After starting MD_SHELL the basic menu will come up on the screen with the following display



4.1 Menu option “Environment”

This menu option includes the following features:



The first three menu items use the Copy feature to load, save or print a parameter file. In addition this feature allows you to copy entire parameter files from a source medium to a target medium. As source/target media the following parameter carriers are available:

CONTROLLER: Servo controller with certain unit address (0...59).

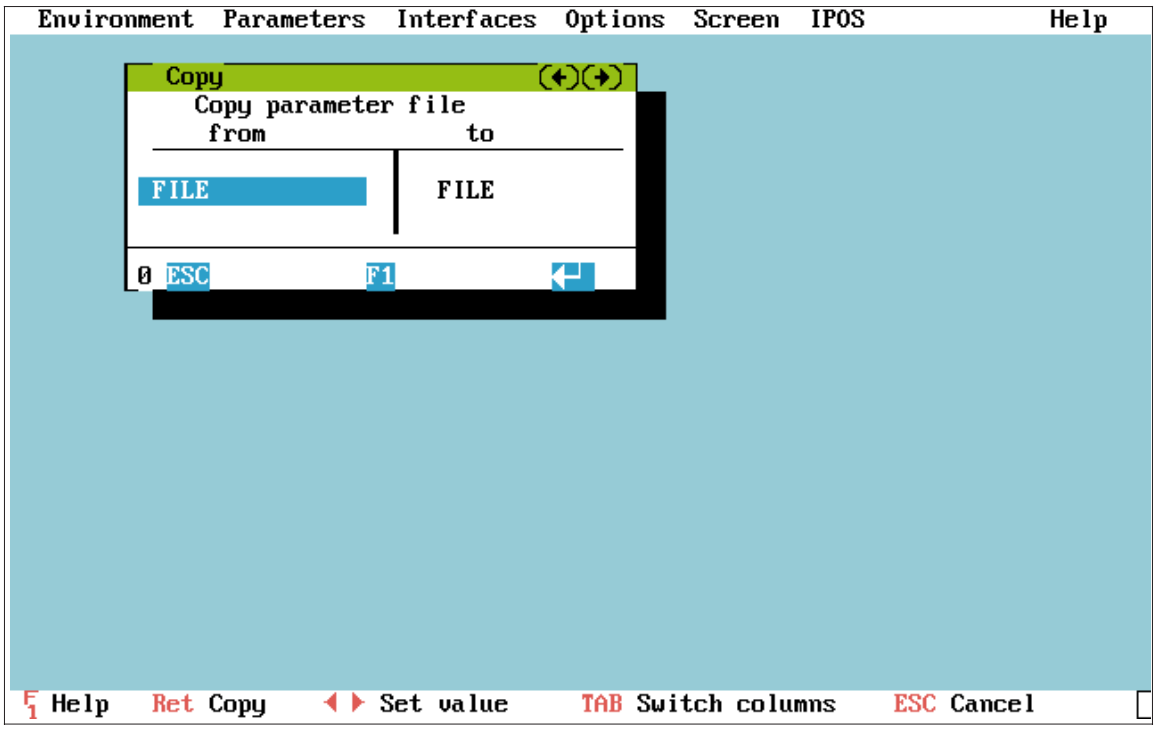
FILE: Parameter file with certain file name on diskette or hard disk.

LEFT: Left column of an editing window with a certain window number.

RIGHT: Right column of an editing window with a certain window number.

PRINTER: Can be specified as target medium to print out parameter files.

On selecting one of these menu items this Copy window will appear on your screen:



After setting the desired parameters in the Copy window, press <RETURN> to start the copying. If all copying requirements are met and the entries made correct, the program will start copying your file. Another window will appear on your screen with a bar indicating the percentage of data already copied.

The Copy window is a modal window, i.e. apart from entries affecting the window itself, no other menus or windows can be activated.

General description:

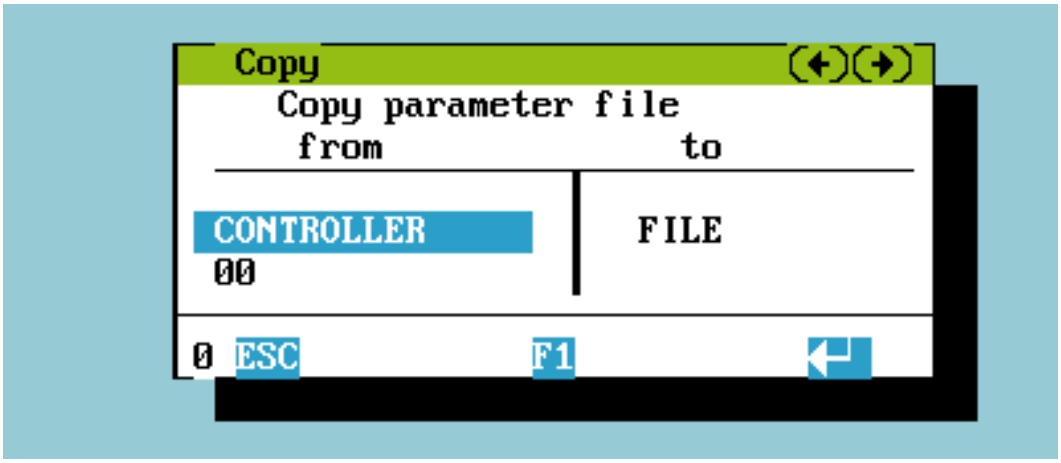
The Copy window has two columns, with two lines each. The first left line designates the source in a general manner (FILE, CONTROLLER, LEFT, RIGHT), the second line specifies the source (servo controller address, file name, editing window number). The first right line designates the target in a general manner, the second line specifies the target.

Type:	System window
Height	–
Move	X
Deactivate	–
Edit contents	X
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Abort copying; close window
↵	↵	or double-click	Start copying
←	(←)		Upper line: Select source/target
→	(→)		Lower line: Specify source/target
↑			Move between lines
↓			
→|			Move between columns
F1	F1		On-line Help

4.1.1 Menu item “Save parameter file”

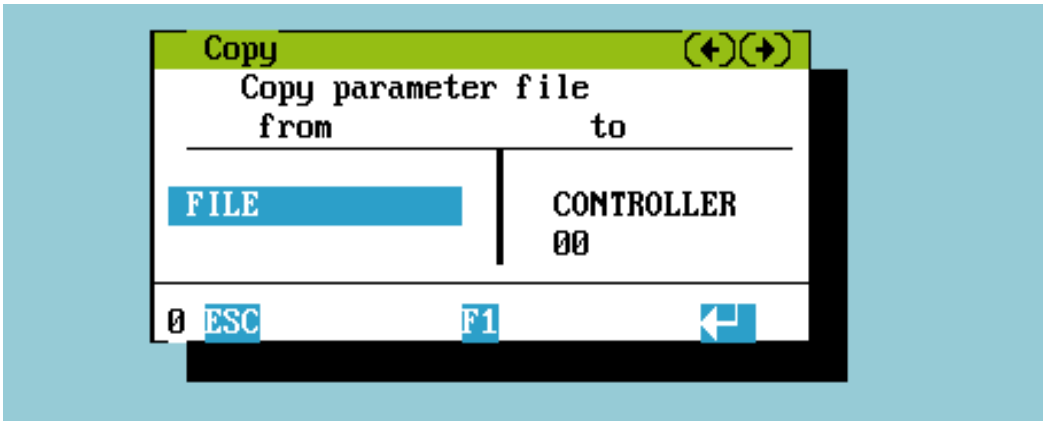
Use this menu item if you wish to save a parameter file from a servo controller to a hard disk or diskette. The Copy window will appear on your screen (see section 4.1) with the default entries “ CONTROLLER” for the source medium and “FILE” for the target medium. The servo controller address entered by the program is that of the active controller window. If there is no such window, the servo controller address last selected is entered. The file name suggested by the program is the file name last selected. Use the <TAB> key to move



the selection bar and then press the <RIGHT ARROW> key to change any of the four default entries. Press <RETURN> to start the copying process.

4.1.2 Menu item “Load parameter file”

Use this menu item if you wish to load a parameter file from hard disk or diskette to a servo controller. The following Copy window will appear on your screen (see section 4.1) with the default entries “FILE” for the source medium and “ CONTROLLER” for the target medium. The servo controller address entered by the program is that of the active controller window. If there is no such window, the servo controller address last selected is entered. The file name suggested by the program is the file name last selected. Use the <TAB> key to move the selection bar and then press the <RIGHT ARROW> key to change any of the four default entries. You may, for instance, change the data source to “CONTROLLER” if you wish to

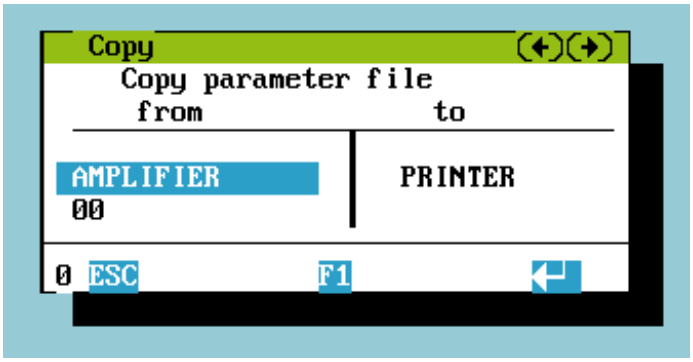


4.1.3 Menu item “Print parameter file”

Use this menu item if you wish to print out the parameters of a servo controller. The following Copy window will appear on your screen (see section 4.1) with the default entries “CONTROLLER” for the source medium and “PRINTER” for the target medium. The servo controller address entered by the program is that of the active controller window. If there is no such window, the servo controller address last selected is entered. The file name suggested by the program is the file name last selected. Use the <TAB> key to move the selection bar and then press the <RIGHT ARROW> key to change any of the three default entries.

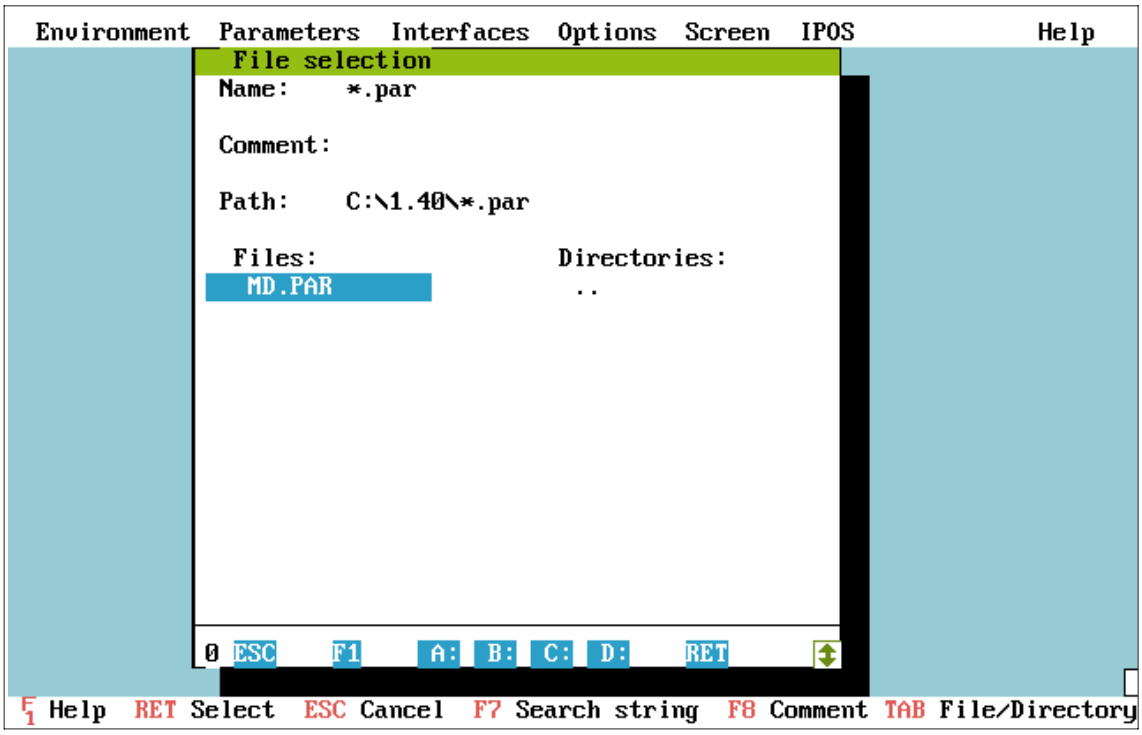
You may further print your controller data to a file instead of sending them to a printer for printout. This will allow you to view the parameter file with a text editor if you have no printer available. Just enter “File” when prompted for the target medium and specify a file name to which to print the controller data.

To select a file name use the file selection window (see next section for detailed information).



4.1.4 The menu item “Delete parameter file”

Upon activating the menu the following window appears:



The file select window consists of four separate input fields.

The uppermost field **Name:** is for entering the name of the file which to be deleted. The name is always relative to the current directory, which is always displayed in the **Path:** field. This field can be edited if selected with the mouse or by pressing the <RIGHT_ARROW> key.

In the next field down, **Comment:**, information regarding the selected file appears and can be edited. This option has no effect when deleting a file. This field can be edited if selected with the mouse or by pressing the <LEFT_ARROW> key.

The field to the lower left designated **Files:** lists all files in the current directory with the suffix .par.

By scrolling through the lines with the cursor keys a file can be selected for deletion from those listed. The selected filename then also appears in the Name field above.

The field to the lower right designated **Directories:** displays the subdirectories of the current directory. By selecting a line from those listed and pressing the <RETURN> key the contents of the selected subdirectory are then displayed. To return to the previous directory select the root symbol .. and press the <RETURN> key. To move between the Files: and Directories: fields, use the <TAB> key.

To switch between disks the desired drive designation can be entered in the **Name:** field or enter the drive letter (i.e. A - D) directly.

Once the file to delete is selected, proceed by pressing the <RETURN> key. An input window then appears in which the delete selection must be confirmed (<RETURN> key.) or cancelled <ESC> key.

With the help of this menu it is possible to delete MC_SHELL generated parameter files!

General description:

Type: System window	
Height	–
Move	X
Deactivate	–
Edit contents	X
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Delete selected file
←	(←)		File name, edit comment
→	(→)		
↑			Select file
↓			
→|			Move between input boxes
F1	F1		On-line Help

4.1.5 Menu item "MD_SCOPE"

MD_SCOPE is a graphic user interface for the MOVIDYN® AC servo controller series, which enables internal process values of the AC servo controllers system to be represented graphically. Activating this menu item will take you out of MD_SHELL and - provided it is installed - call up the MD_SCOPE program. To tell MD_SHELL where MD_SCOPE resides, you have to enter the path name in the MD_SHELL.INI file prior to starting MD_SHELL (for details please refer to chapter 3.1).

4.1.6 Menu item "MD_POS"

MD_POS is a user interface used to program the optional positioning p.c.b (API/APA). For details on the program's installation and operation please refer to para. 4.1.5 above.

4.1.7 Menu item "End"

Selecting this menu item will end the program and take you back to the DOS command level.

Prior to returning to the DOS level, the program will do the following operations for you:

- Create a desktop file and save the information displayed in the window.
- Create a MNU file and save the set user menu.
- Update the INI file.

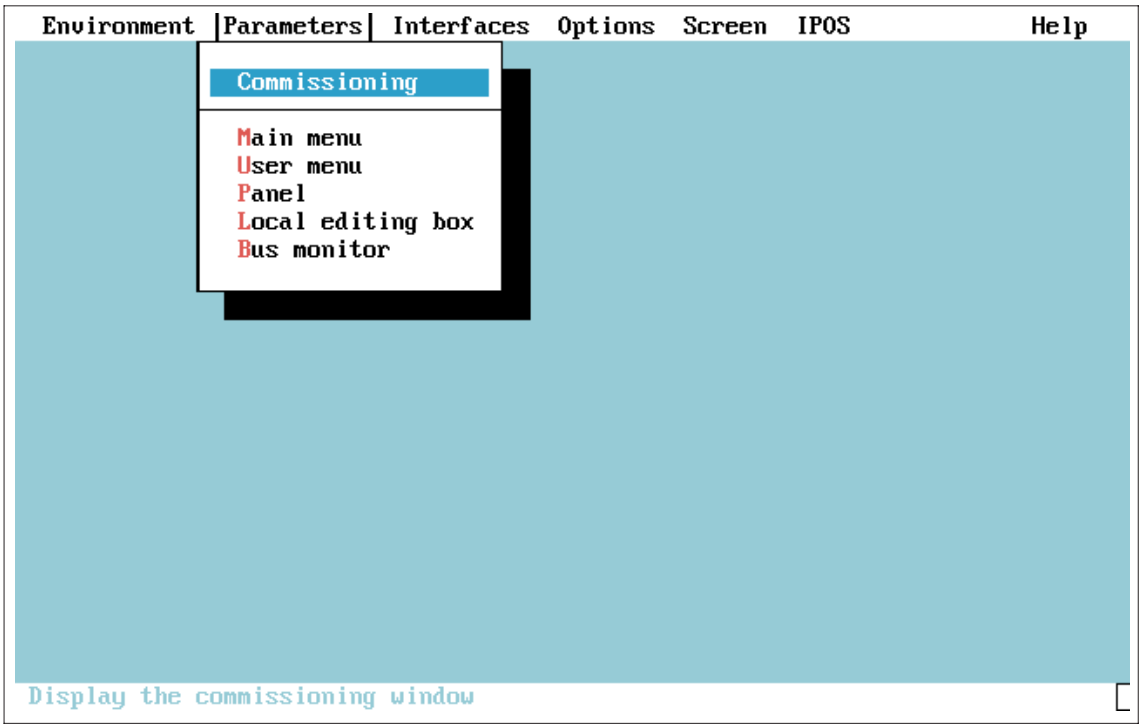
General description:

Type:	System window
Height	–
Move	X
Deactivate	–
Edit contents	X
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		End feature, close window
↵	↵	or double-click	Carry out feature
↑ ↓		〉	Select desired option

4.2 Menu option “Parameter”

This menu option comprises the following menu items:

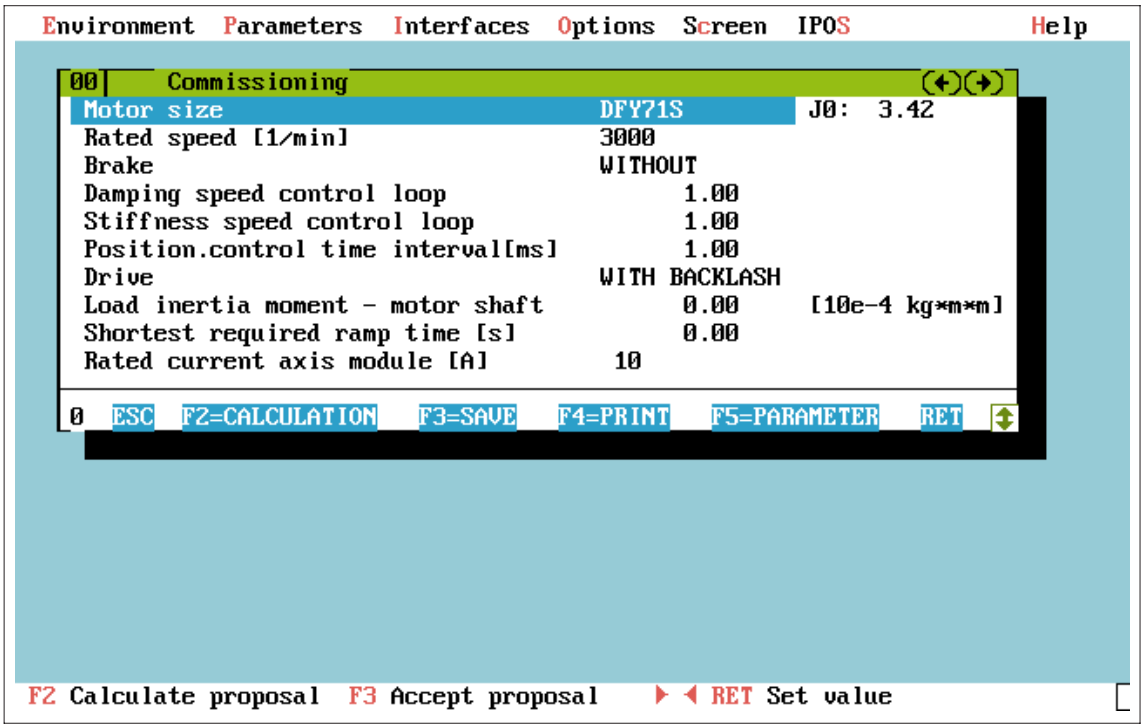


4.2.1 Menu item “Commissioning”

MD_SHELL’s commissioning window allows you to automatically select the most important parameters for your application from a multitude of available parameters and set them as required. For this purpose set the parameters characteristic of your installation listed in this window (motor type, rated speed, mass moment of inertia, etc.). Press <F2> to start calculation of the AC servo controller parameters or click the [F2=CALCULATION] box with your mouse.

To save the values calculated on your PC to the controller press <F3> or click the [F3=SAVE] box with your mouse.

Your AC servo controller parameters have now been set automatically. The following figure shows the commissioning window.

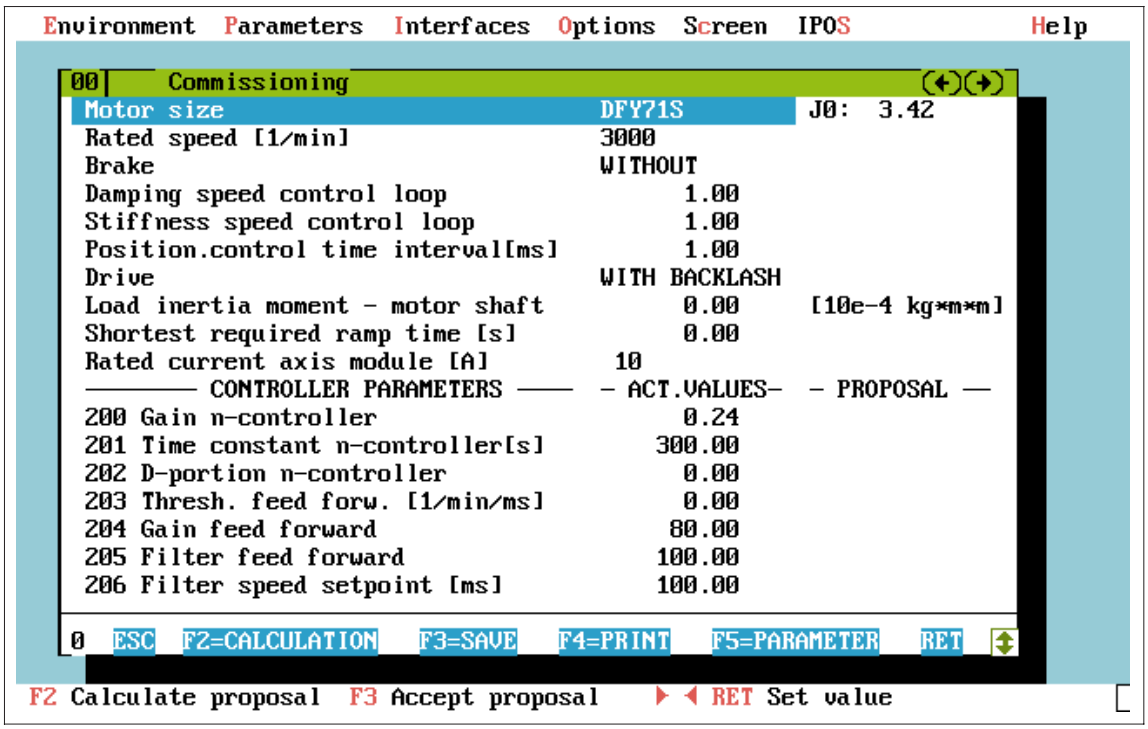


If you are interested to see the values calculated for the different parameters you can open the commissioning window by pressing <F5> (or clicking [F5=Parameter]). To close, just press <F5> (or click [F5=Parameter]) again.

There are three columns displayed in the opened window. The left column contains the designation and the menu number of the controller parameters. The centre column contains the current parameter values, which can be changed if required. The right column contains the proposed values, which are calculated based on the installation parameters in the upper window section. The suggested values cannot be changed directly.

To accept the suggested values press <F3>. This will copy the right column to the centre column, which is tantamount to sending the suggested values to the AC servo controller.

The following figure shows the commissioning window after opening with the <F5> key.



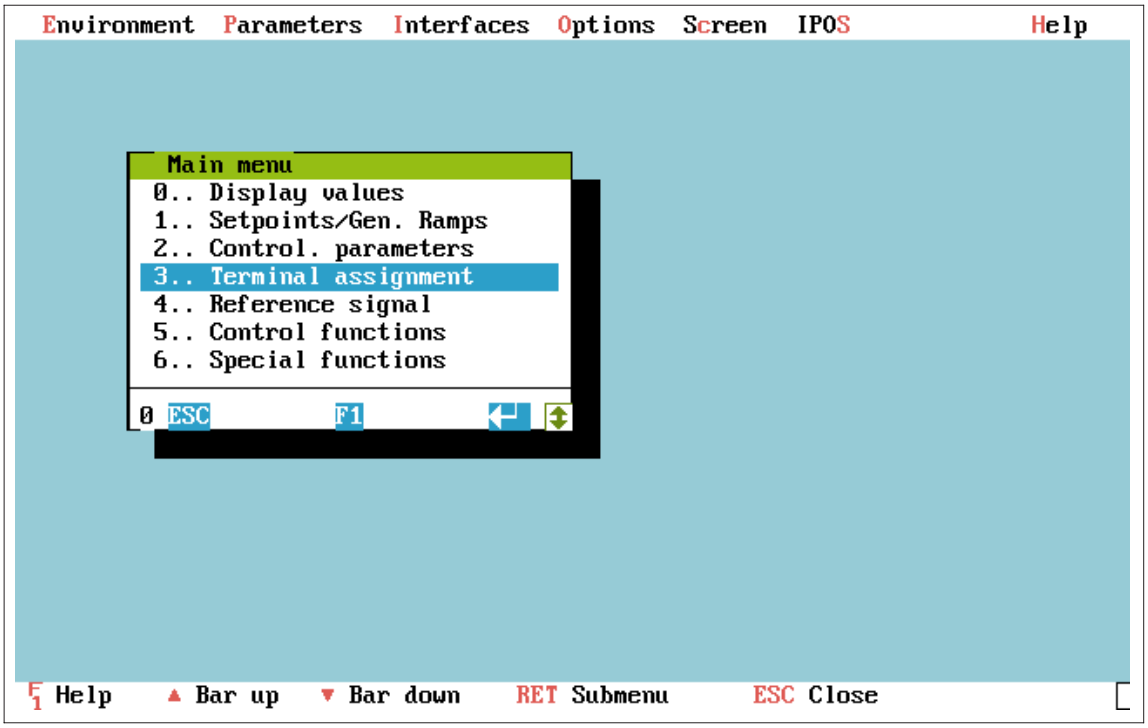
4.2.2 Menu item “Main menu”

In this menu item all settable parameters and process values of the drive unit are listed in hierarchical order. There are three hierarchical parameter levels. The first level, the main menu, appears on selecting *“Parameters/Main menu”*, the second level, the submenu, on selecting a main menu option and confirming with <RETURN>. From the submenu level you get to the last level, where the window displayed contains all the parameters pertinent to the selected submenu, some of which can be changed if required. This individual menu window offers several other features, which will be discussed in the following.

You can adjust size and location of all three windows on your screen individually to suit your requirements. The programs central interface control also enables you to open several windows of the same type (main menu, sub-menu, individual menu) several times or to activate the menu option *“Parameters/Main menu”* a second time. This feature allows you to visualize, for example, process values located in different submenus or individual menus on the screen at the same time or to observe and influence process values of different drive units.

General window functions such as changing the active window with the mouse or via the keyboard, moving the bar, changing size and location of a window, etc. are described in section 5, window functions.

At the bottom of the screen a selection of keys with which to operate the active window is displayed.



4.2.2.1 Main menu and submenu windows

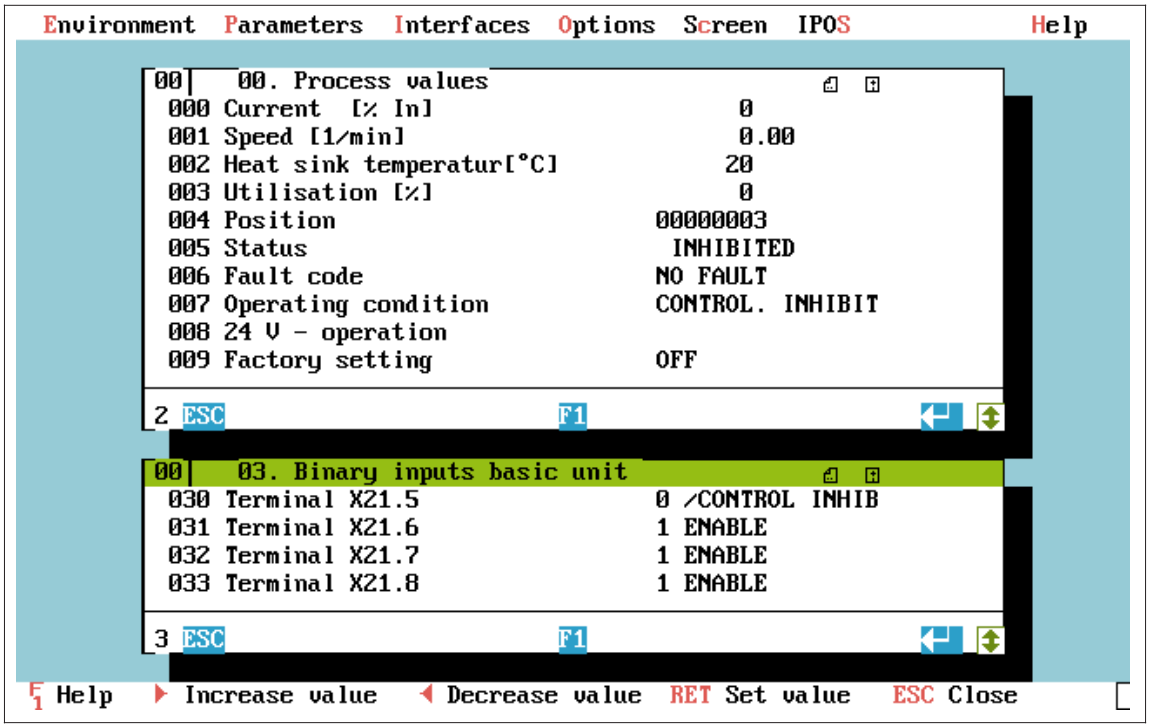
General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	–
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Open submenu/individual menu window
↑			Move bar inside window
↓			Select submenu/individual menu
F1	F1		On-line Help

4.2.2.2 Individual menu window

The individual menu window displays the selected parameters of the drive unit. When the window is opened and until it is closed or covered by other windows its contents (parameters) are continuously updated. Thus the parameter display always shows the current value stored in the unit. The following figure shows the structure of an individual menu window:



Generally, there are two types of individual menu windows:

a. Windows with setting parameters
b. Windows with process values (display values)

Unlike windows displaying setting parameters, process value windows do not have a selection bar and no buttons to change the values displayed.

General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Edit parameter
←	(←)		Decrease parameter value
→	(→)		Increase parameter value
↑			Move bar up
↓			Move bar down
F1	F1		On-line Help

Editing servo controller parameters

To edit parameters in an opened individual menu window, two different mechanisms have been implemented.

1. Using the <RIGHT_ARROW>/<LEFT_ARROW> keys or clicking the corresponding arrow symbols with the mouse increases/decreases the value selected with the bar by a certain increment. With some parameters the step size is changed automatically when the set changeover value has been reached. Upon reaching the final value (maximum/minimum) further entries will have no effect. If you intend to change certain values by a larger amount, the time required to do it this way may prove a bit of a nuisance. This is why we have provided for a way of entering numerical values directly.

2. To enter a numerical value directly, move the bar to the parameter you want to edit and press the <RETURN> key. This will display an editing window at the selected parameter field (bar position). The size of the window depends on its type (i.e. decimal, integral, negative) and the parameter's value range (number of places). Please also note the following:

   On confirming the entered value with the <RETURN> key it is transferred to the unit's memory and sent to the drive unit. Values, which the drive unit cannot process (values outside a given value range, impermissible resolution), are not accepted by the editing window. Instead, a valid value closest to the entered one (e.g. minimum/maximum) will appear in the window. To accept the suggested value, just press the <RETURN> key again. For further details on minimum, maximum, and step sizes press <F1> (on-line Help). To exit Help press <ESC> and continue editing.

For parameters with an alphanumerical value display (e.g. terminal assignment) a selection window is opened, where the desired value can be selected via the keyboard or the mouse. Pressing <ESC> aborts the editing process and removes the window from your screen, the original value remains unchanged. While the editing window is displayed the mouse is deactivated.

Copying/Retrieving/Saving parameters

As described in section 4.1.4 the copy feature will copy complete parameter files between different "parameter carriers" for you. The approach described there referred to menu item *"Environment/Copy parameter file"*. The individual menu windows offer a different, mouse-supported option.

a. Copying from one AC servo controller to another:

   Open two individual menu windows for different drives (different addresses in the upper left window corner). Move the mouse pointer to the individual menu window of the "source unit" and press the right mouse button. Below the mouse pointer a two-line bar will appear, with the data source in the upper line (position when pressing the right mouse button) and the data sink, the "target unit" where to copy the data to, in the lower line. Then, press the right mouse button, drag the mouse to the individual menu window of the "target unit" and release the mouse button. Your screen will display the familiar copying window already containing the desired entries. While moving the mouse pointer the target indicated will change depending on the position of the mouse pointer on your screen. To start copying, press <RETURN> or double-click.

b. Copying from the AC servo controller to a file:

   Open an individual menu window for the drive unit, whose parameters you want to save to a file. Move the mouse pointer to this window and press the right mouse button. The bar with the address of the "source unit" will appear. Drag the mouse pointer to the diskette symbol in the upper right window corner next to the arrow symbols and release the mouse button. The file selection window will be displayed. After entering a valid file name the display will return to the copy window. To start copying confirm the displayed entries.

c. Copying from a file to the AC servo controller

   Same as the above para. b. except that you have to click the diskette symbol first and then move the mouse pointer inside the window.

Setting the unit address

The MD_SHELL user interface allows for several drive units to be connected to the PC. To differentiate between the units these are assigned different addresses, which are set at the unit's front panel. The address of the drive unit, whose parameters are visualized in the window, is displayed in the individual menu window in the upper left window corner. When a window is opened, always the address of the active unit is entered. There are two ways of changing the address of a menu window:

1. Before opening the individual menu window in menu item *"Interfaces/Controller address"* activate the drive with the desired address.

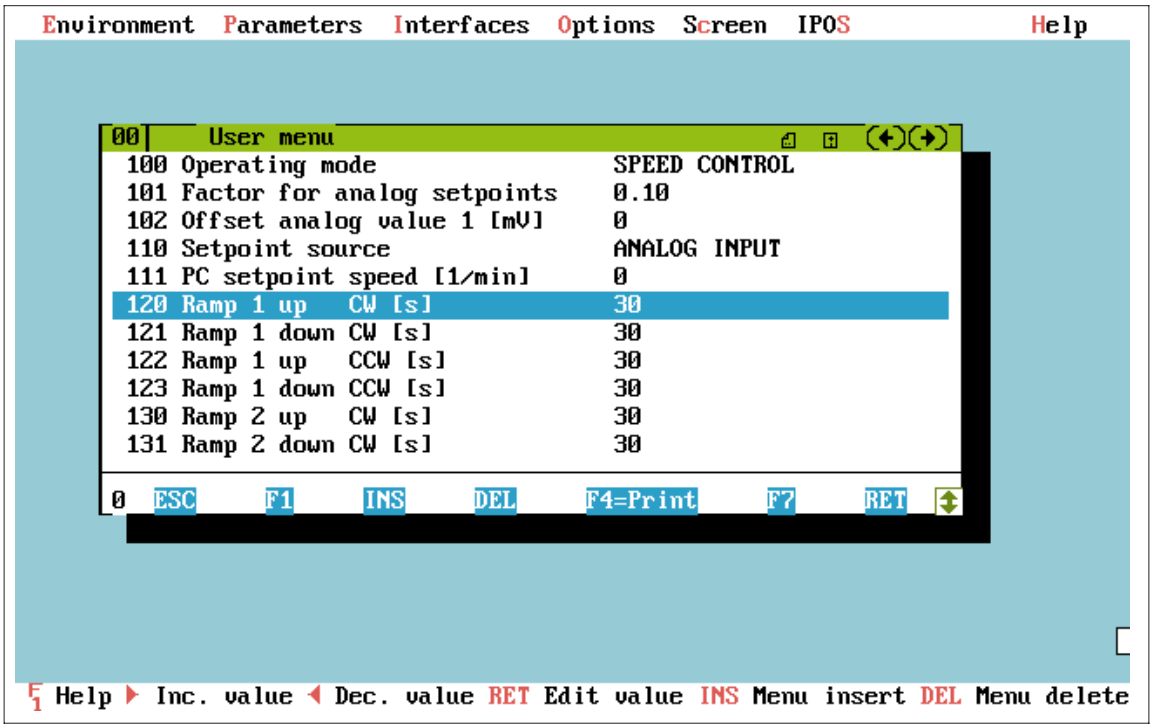
2. Using the mouse click the address in the upper left window corner. This will display the selection window where you can select the new address.

In both cases an input box will pop up on your screen where you can enter the new address.

4.2.3 Menu item “User menu”

The user menu window corresponds to an individual menu window except that you can determine the parameters displayed in this window yourself. This feature allows you to list frequently used parameters or parameters of particular interest in one window. You can also delete or insert parameters as required. The set window configuration is saved to your hard disk when you exit the program and available again when you restart the program.

The following figure shows a user menu window with a specific selection of parameters:



Inserting a parameter

Pressing the <INS> key ([INS] box) will display an editing window at bar level, where you enter the desired parameter number (menu item number). Press <RETURN> to insert the new parameter at the bar position. If the parameter does not appear, there may be several reasons:

– The entered parameter number does not exist.

  Check whether the entered parameter number is correct (see operating instructions or open an individual menu window). The parameter number already exists in your user menu. Each parameter can be inserted only once in the user menu.

– The maximum number of parameters that can be inserted has been reached.

  You are allowed up to 100 entries. Before inserting new parameters, check wether there are old ones you might want to delete.

Deleting a parameter

Press <DEL> ([DEL] box) to delete the highlighted parameter (at the bar position) from the user menu. The last parameter in the window cannot be deleted!

Printing the user menu parameters

You can also print out the parameters which you have included in the user menu. Press the <F4> function key (or click on the corresponding button) to print out the parameters and their values, which are currently set in the user menu. You may also print the data to a file.

Setting the standard user menu

Press the <F7> key (button [F7]) to activate a preset user menu. The parameters contained in this menu correspond to those entered in the commissioning window (see section 4.2.1).

Caution:

All parameters previously contained in the user menu will be deleted.

General description:

Type: Application window	
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

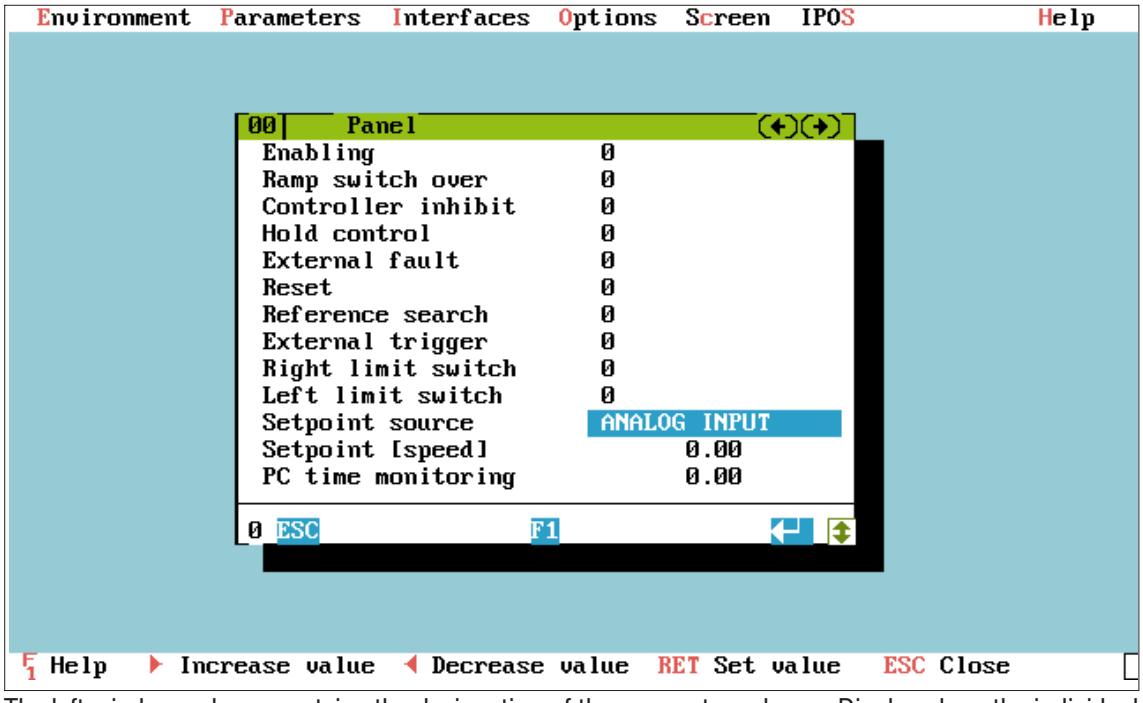
Key	Button		Action
			Close window
		or double-click	Edit selected parameter
			Increase parameter value
			Decrease parameter value
			Move bar up
			Move bar down
			Move between left and right window column
			Activate standard user menu
			On-line Help
			Delete parameter
			Insert parameter

4.2.4 Menu item “Panel”

The panel option allows the user to completely control the drive unit via the user interface, For safety reasons there is a link with the physical unit terminals provided the terminals have been programmed to have the equivalent functions. The following table shows which signal levels must be present at the terminals in order to activate the respective function.

Functions	Panel	Terminal	Function active
Enable	0	0	no
	0	1	no
	1	0	no
	1	1	yes
Controller inhibit/Ext. fault/ccw limit switch/ cw limit switch	0	0	yes
	0	1	no
	1	0	yes
	1	1	yes
Ramp generator switchover/ Hold control/Reset/Reference travel	0	0	no
	0	1	yes
	1	0	yes
	1	0	yes

On selecting this menu item the following window is displayed:



The left window column contains the designation of the parameters shown. Displayed are the individual unit functions, setpoint source and the setpoint. The right column shows the current values of the parameter, with “1 denoting an active and ”0" non-active function. To turn the functions on or off, click boxes [<] or [>] or the [LEFT ARROW] or [RIGHT ARROW] keys.

Caution:
In order for the drive to accept the set functions, the setpoint source parameter must be set to “PC INTERFACE”!

The panel window, like the individual menu windows, can be assigned to a certain drive unit via the address selection feature. To copy the set values from one unit to another use the copying feature. Please note though, that this feature will copy all parameters of a certain unit.

The PC time monitoring parameter contained in the last line of the panel serves to control the communications link between PC (PLC or the like) and the AC servo controller. The AC servo controller expects new data to be transmitted by the control system within the time specified. If no data are transmitted within the given time frame it will trigger a fault. If the parameter is set to zero, the monitoring is deactivated.

Caution:

If the MD_SHELL panel is used as control, there is no guarantee that the controller is provided with data in every program situation. As a result it cannot be ensured that the monitoring time limits are observed. We therefore recommend to activate this parameter only if a PLC or other type of control system is used, which provides the servo controller with data in cyclic intervals.

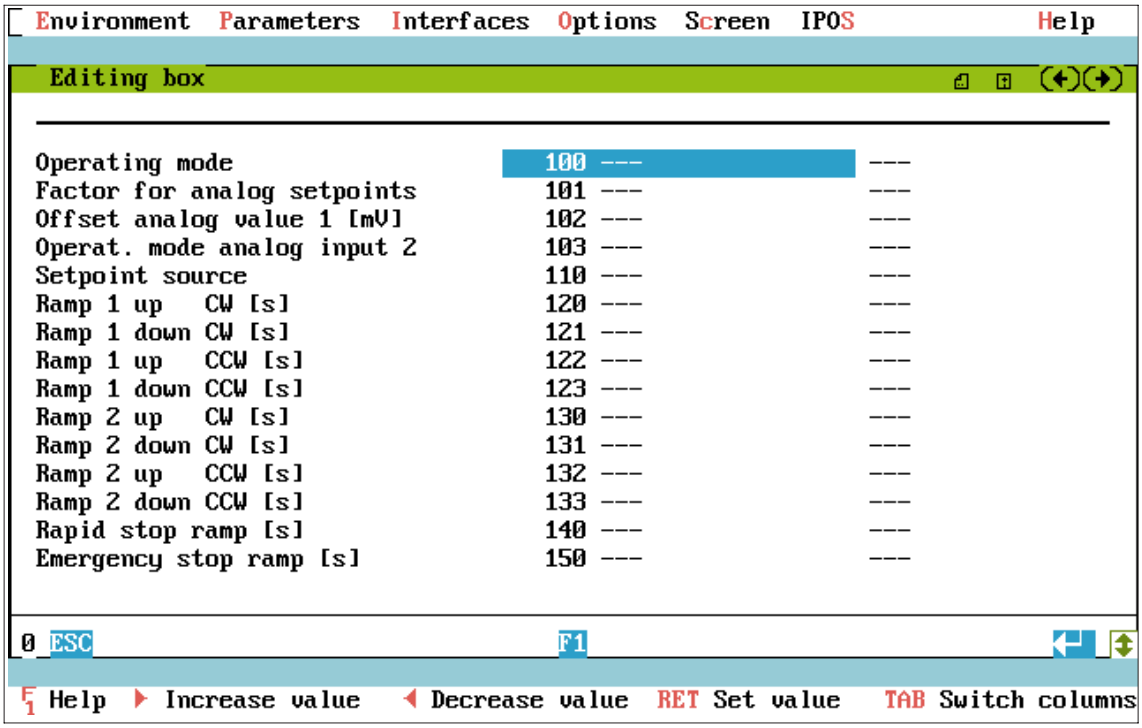
General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

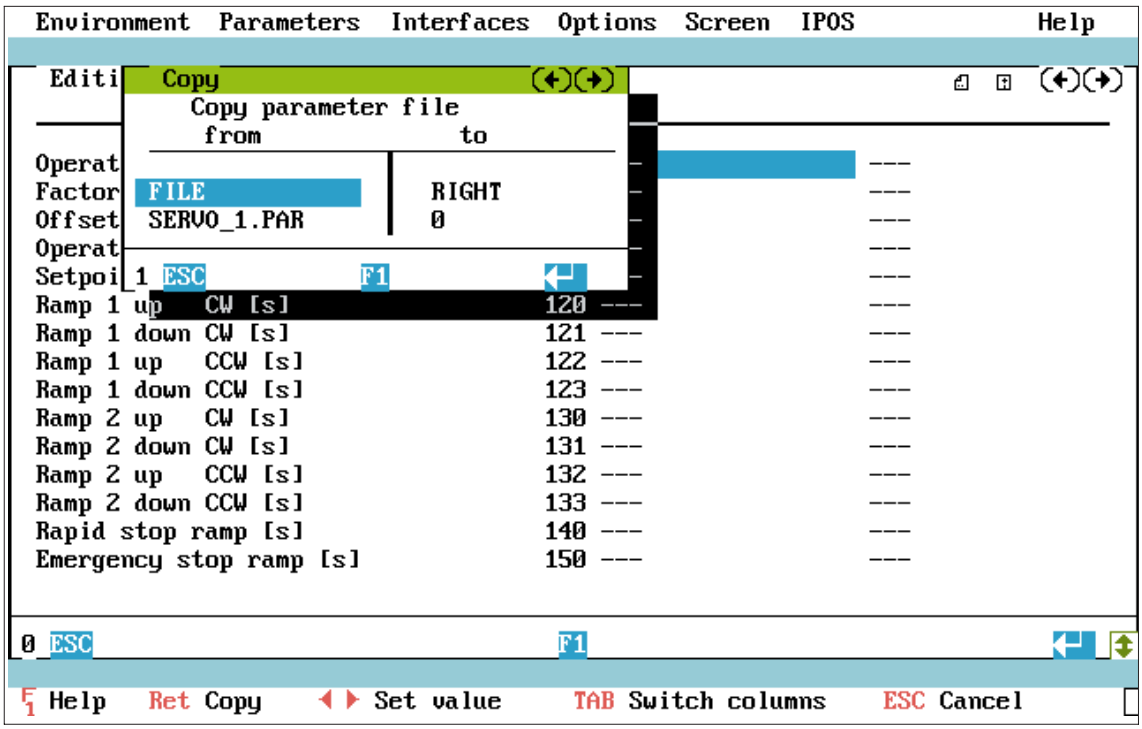
Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Edit parameter
←	(←)		Decrease parameter value
→	(→)		Increase parameter value
↑			Move bar up
↓			Move bar down
F1	F1		On-line Help

4.2.5 Menu item “Local editing box”

The local editing box is used to process parameter files without simultaneously changing these parameters in the drive. This box allows you to adapt, correct and compare parameter files prior to sending them to the unit, saving them to hard disk/diskette or printing them. The editing box has two columns. You can retrieve one parameter file into each of these columns. The menu number of the respective parameter is indicated in front of the left column and an asterisk (‘*’) indicates if the values in the left and the right columns differ. When the menu is called up, the editing box is empty still:

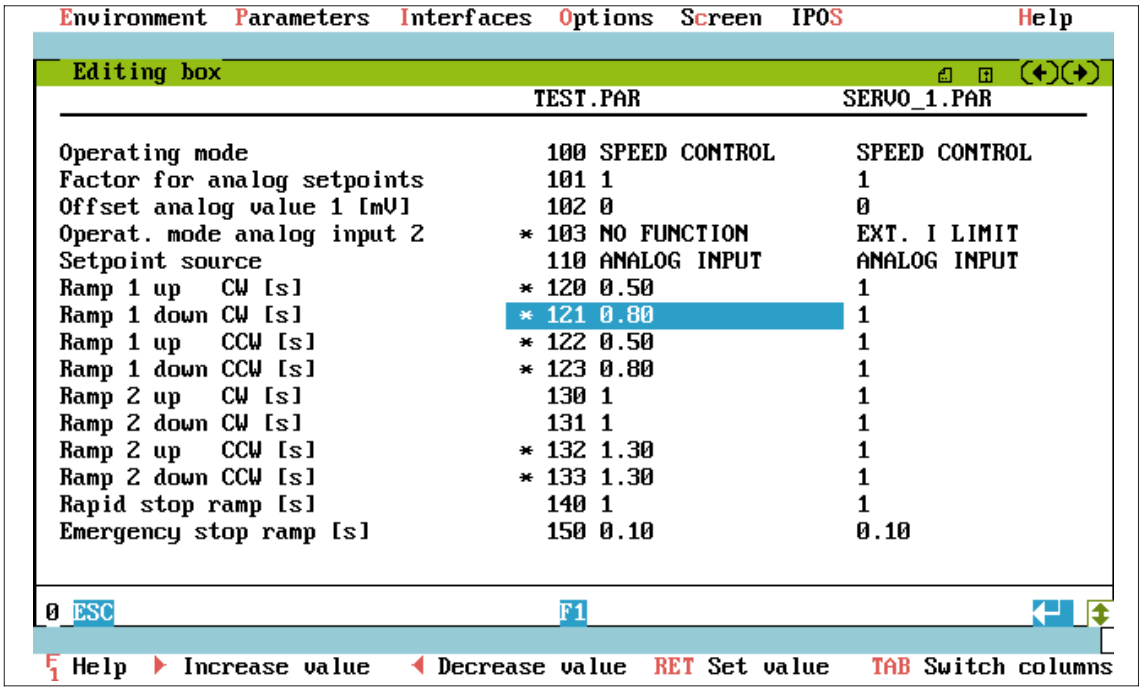


To retrieve parameter files from the drive or hard disk to the left or right window column use the copy feature (please refer to sections 4.1.4 and 4.2.2.2) and enter the corresponding target values in your copy window.



This setting will copy parameter file “SERVO_1.PAR” from the hard disk to the right column of your editing box 0. The number of the editing box corresponds to the number of the window box, which is displayed in the lower left window corner. This number will help you identify several active editing boxes.

The following figure shows the editing box after retrieval of two parameter files to the right and to the left column resp.



The asterisk’*’ in front of the menu numbers identifies lines, where the parameters in the left and the right columns are different.

Editing parameter values:

To edit parameter values proceed as described in item individual menu window (please refer to section 4.2.2.2). To move between window columns use the <TAB> key.

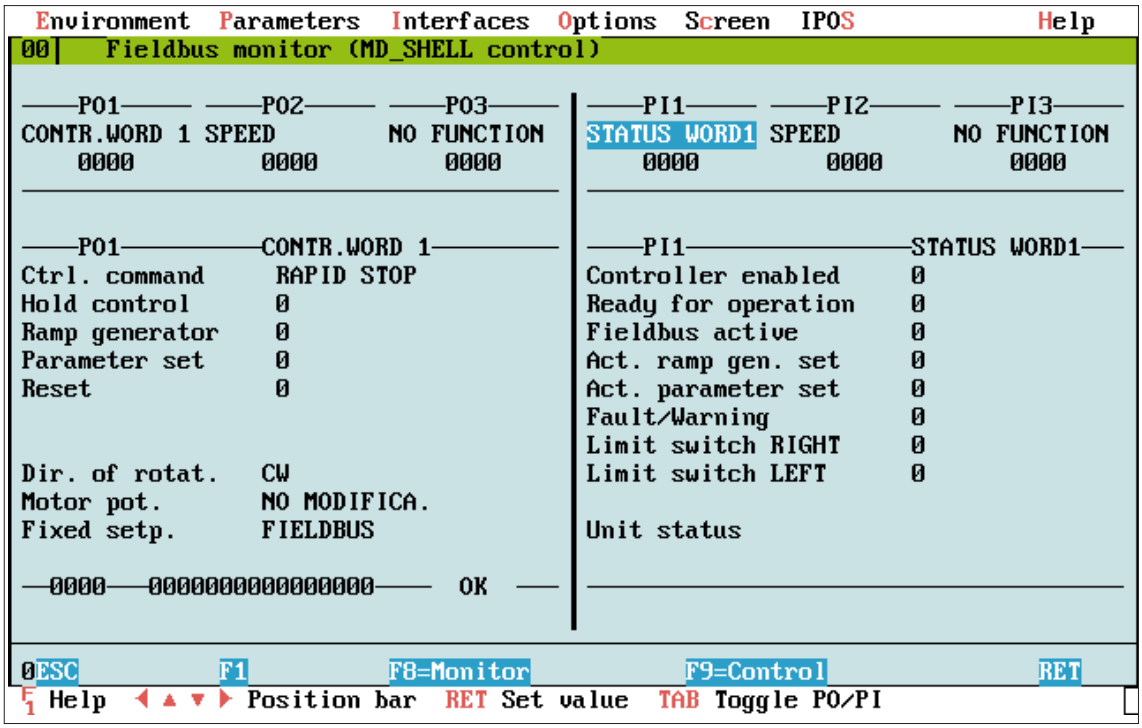
General description:

Type: Application window	
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Edit parameter
→	(→)		Increase parameter value
←	(←)		Decrease parameter value
↑			Move bar up
↓			Move bar down
→|			Move between right and left column
F1	F1		On-line Help

4.2.6 Menu item “Bus monitor”

After calling the “Parameters/Bus monitor” menu item the following window will appear on your screen:



The fieldbus monitor allows you to display (**Monitor** mode) and edit (**Control** mode) the fieldbus process data PO1..PO3 and PI1..PI3 via the serial interface of the servo controller.

The fieldbus monitor is a convenient, user-friendly commissioning and diagnostic tool when you use the servo controller in a fieldbus environment. Its two modes “**Monitor**” and “**Control**” allow you to switch between the diagnostic mode, where you can only look at the process data channels and their settings, and the control mode where you can also make changes via the PC.

The (max.) 3 process output data words PO1..PO3 are for control of the servo controller and setpoint entry while the (max.) 3 process input data words PI1..PI3 are for actual value and status data display.

The bus monitor can only be called up if MD_SHELL is **not** in the offline mode (menu item “Interfaces/PC interface” not set at “no servo controller connected”) and the addressed unit is fitted with the correct option.

When fitted with an appropriate option pcb a servo controller can be controlled via fieldbus. For this purpose a standard unit profile is used, which is identical for the different fieldbus systems (see “Fieldbus Unit Profile User Manual” documentation).

All parameters of the MOVIDYN® servo controller can be read and written both via the serial interface and the fieldbus interface. Consequently, parameters, which are written via the fieldbus for example, can also be read and monitored via the serial interface.

The bus monitor operates in two different modes, the **Monitor** mode and the **Control** mode.

In the **Monitor** mode the servo controller is controlled via a fieldbus system, while the bus monitor allows you to monitor the control commands from the bus and the response of the servo controller to these

commands via the controller's serial interface. This mode is an excellent monitoring tool when the servo controller is controlled via a fieldbus system.

Unlike the **Control** mode it is not possible to edit setpoints or process data assignments when the bus monitor is in this mode!

To activate the **Monitor** mode press the <F8> function key.

When set at **Control** mode you can use the fieldbus monitor for manual control of the servo controller via PC. The servo controller will show the same drive behaviour as when controlled via the fieldbus interface. This mode allows you for example to familiarize yourself with the control concepts of the MOVIDYN® servo controller when controlled via a fieldbus system.

As MD_SHELL communicates with the servo controller via the controller's serial interface, this feature allows you to get to know the fieldbus functions of the servo controller without a fieldbus master, by entering all setpoints manually via the fieldbus monitor.

In this case the process data for the fieldbus are disabled. While in this mode, the fieldbus remains without effect.

To activate the **Control** mode, press the <F9> function key.

The bus monitor window is divided into three sections:

- the **PO/PI line**, which comprises the two upper lines of the window
- the **PO data word section** in the lower left hand area of the window and
- the **PI data word section** in the lower right hand area of the window.

PO/PI line

The process data words PO1..PO3 and PI1..PI3 are displayed in the upper two lines of the window, the so-called PO/PI line. The PO/PI line displays the assignment of the process data words in plain text and their current value in hexadecimal format. You can change both the assignment of the process data words and their value (the latter however only in the case of POs). Highlight the value you wish to change with the cursor keys or the mouse. The current assignment and values of the highlighted process data word is then shown in detail in the PO data word section or the PI data word section in the lower part of the window.

PO data word section

The PO data word section shows the interpretation of the process output data in conformance with the unit profile. The process output data word displayed in this section is always the data word last highlighted in the PO/PI line.

Any changes in this section must be confirmed with o.k. to become effective in the servo controller. For control purposes the entry is shown both in hexadecimal and in binary format.

PI data word section

The PI data word section shows the interpretation of the process input data in conformance with the unit profile. The process input data word shown is always the data word last highlighted in the PO/PI line.

Notes:

- You may only open one window of this type at a time.
- An inactive bus monitor window is not updated and may have a different display.
- The servo controller can only be controlled via the process output data if the **Setpoint Source Fieldbus** (parameter 110) is active.
- If the servo controller is to be controlled via the fieldbus system or MD_SHELL, it must, for safety reasons, always be enabled on the terminal side as well. Consequently, the terminals must be wired or programmed so that the servo controller is enabled via the input terminals.
- Values changed in the upper two lines are sent to the servo ontroller immediately after they have been edited. Values in the more detailed lower section are sent to the servo controller only after they have been confirmed by highlighting the "OK" button and then pressing RETURN (or double-clicking on the OK button).
- As long as the highlighter bar is in the lower window section any changes of the process data word values via fieldbus are not shown in detail to avoid interfering with the user's own editing.
- If the highlighter bar is in the lower window section and the assignment of the PO word changes via fieldbus, the corresponding PO word is automatically highlighted in the upper two window lines.
- If a position value is entered in the process data it is always split over two process data words, POSITION LOW and POSITION HIGH. The lower two window sections however will always show the position as it is calculated from the two process data words. Correspondingly, when a position has been edited always both process data words which belong together are changed. If one of the two process data words (POSITION LOW or POSITION HIGH) required for the position value is missing when the position is assigned, then the position value displayed is ???.

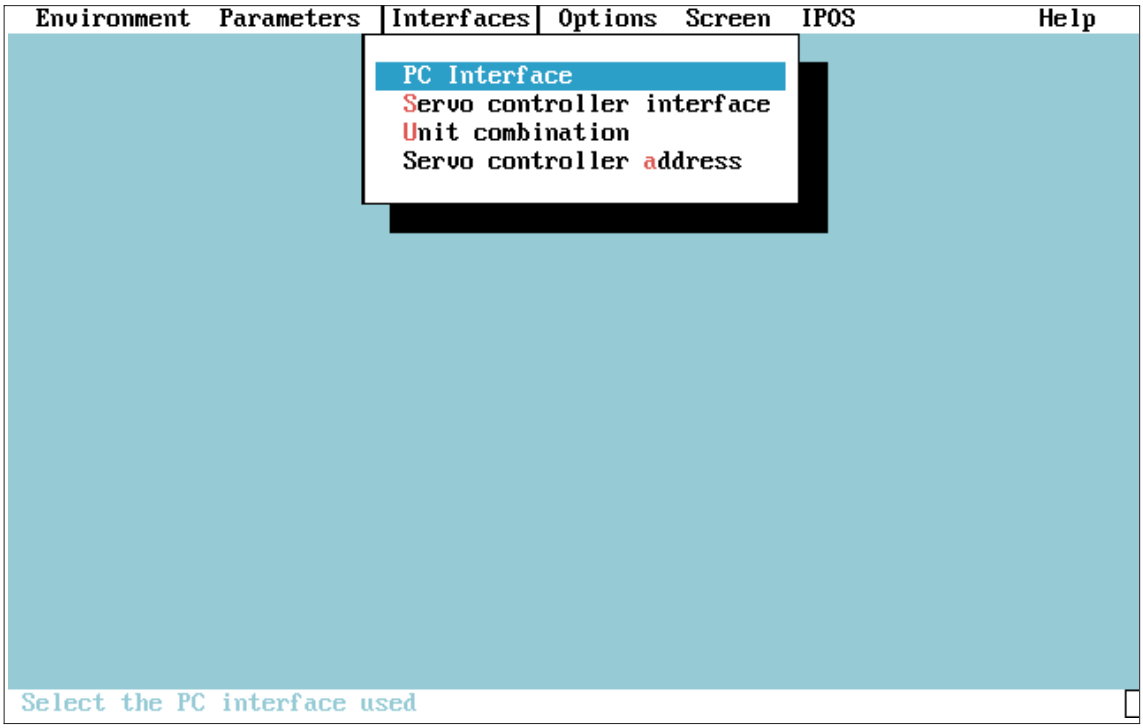
General description:

Type: Application window	
Height	–
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

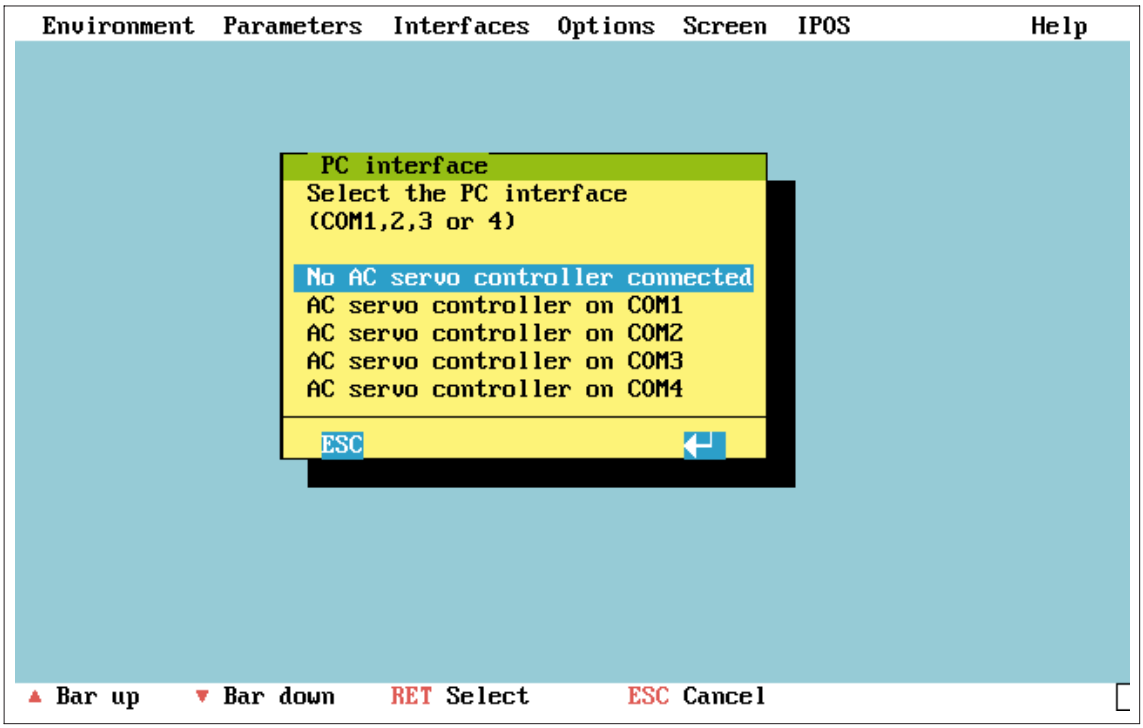
Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Edit value
←			
→			Position bar
↑			
↓			
→|			
F1	F1		Toggle PO/PI
F8	F8		On-line Help
F9	F9		Monitor mode
—			Control mode

4.3 Menu option “Interfaces”

Menu option “Interfaces” comprises the following features:



4.3.1 Menu item “PC interface”



Generally, the MD_SHELL user interface can be operated in two different modes:

a) off-line, i.e. there is no drive connected to the PC
b) on-line

The desired operating mode and the serial interface of your PC via which you want to communicate with the drive unit are determined in this menu item.

If you select the off-line operating mode all parameters are written to the memory of your PC instead of the servo controller and also read out from there. The PC's memory contains a "local servo controller", which can be addressed in the offline mode via address no. 0. This virtual controller is created when MD_SHELL is started and remains in memory until you exit the program. This servo controller can be operated like a real unit, i.e. you can write and read data to and from it.

This operating mode is mainly intended to help you get to know the program and to retrieve parameter files from your hard disk/diskette and work with them.

On selecting the menu item a selection window is displayed where you specify the desired operating mode or the number of the serial interface via which you want to communicate with the drive unit. MD_SHELL only supports interfaces COM1 to COM4. Move the bar to the option of your choice and press <RETURN> to confirm. If carried out correctly, the window will be closed. Should the window remain open after pressing the <RETURN> key, your selection may have been invalid for the following reasons:

– Your PC does not have the interface you selected (COM1 to COM4).

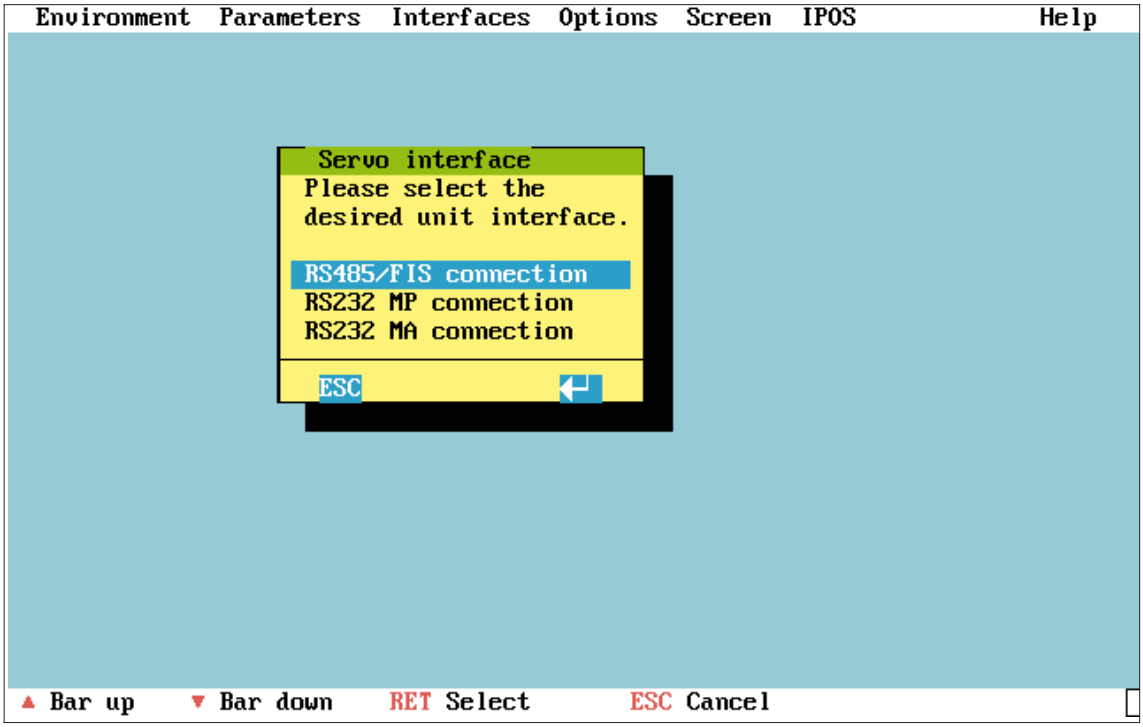
– Your mouse is connected to the interface you selected. If nevertheless you want to use this interface to communicate with the drive unit, you have to remove your mouse driver from your "autoexec.bat" file and reboot your PC.

General description:

Type:	System window
Height	–
Move	X
Deactivate	–
Edit contents	–
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Execute selected feature
↑			Select alternative feature
↓			
F1	F1		On-line Help

4.3.2 Menu item “AC Servo interface”



In principle, there are three ways to connect your PC to the servo drive. These options are shown in the window below:

The correct setting of the servo controller interface depends on the configuration of the PC and the servo controller used.

PC / RS-232	FIS 31 USS 11A	MPR51.., MKS51..	RS-485 / FIS connection
PC / RS-232	MP-RS-232	MPB51..	RS-232-MP connection
PC / RS-232	AIO 11	MKS51.., MAS51	RS-232-MA connection
PC / RS-485	Standard RS-485	MPR51.., MKS51.. MPB51..	RS-485 / FIS connection

Please note that when the AIO11 option pcb is fitted only one axis can be addressed and the set unit address, unlike in the other operating modes, is of no consequence.

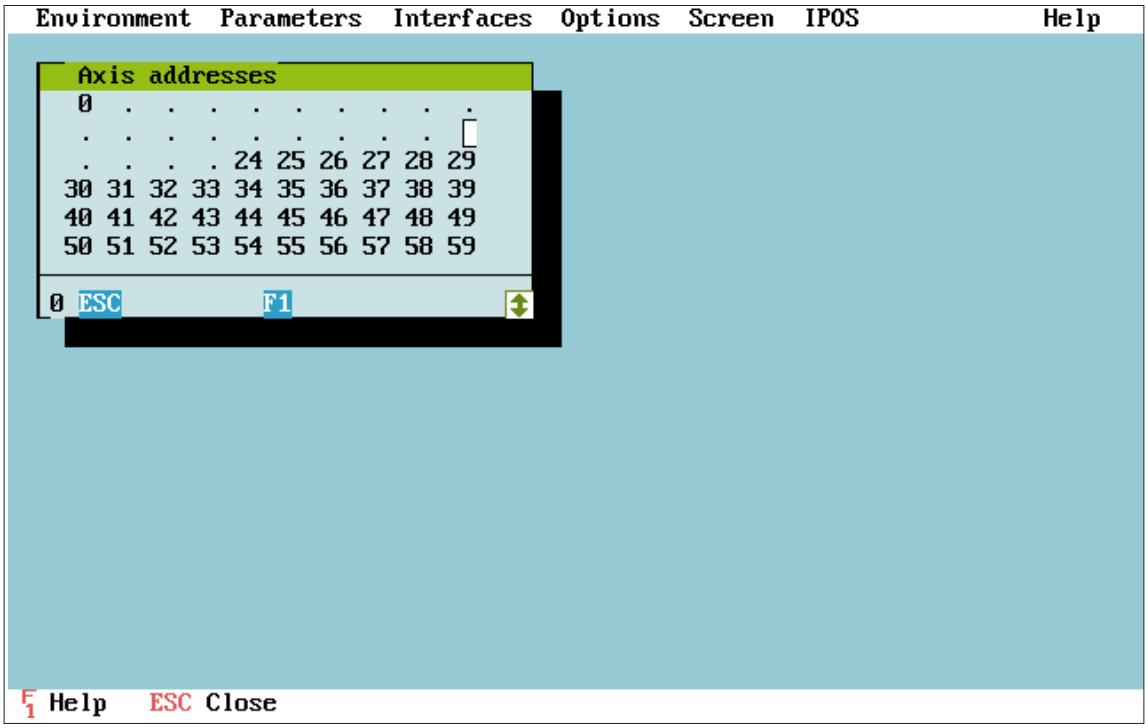
General description:

Type: System window	
Height	–
Move	X
Deactivate	–
Edit contents	–
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Execute selected feature
↑			Select alternative feature
↓			
F1	F1		On-line Help

4.3.3 Menu item “Unit combination”

In this feature the addresses 0...59 are run through in succession to see whether there is an axis module that responds to one of these addresses. This allows you to test whether satisfactory connection has been established with each module. The addresses are displayed in the window shown below. Addresses which are not assigned to an axis module are replaced by a dot. Thus, once the function has been executed, only those controller addresses are shown in the window with which a connection has been established.



General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	–
Update	–
Assign address	–

Key	Button	Action
ESC	ESC	Close window
F1	F1	On-line Help

4.3.4 Menu item “AC servo controller address”

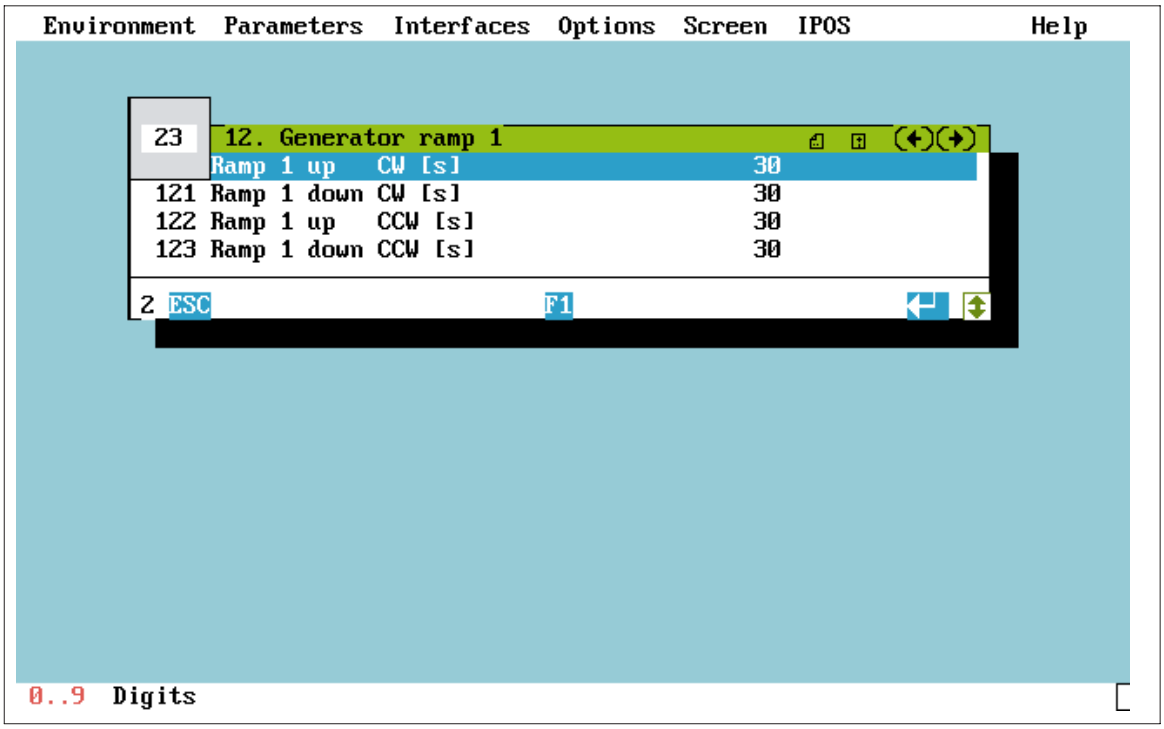
On selecting this menu item an input box will be displayed if the active window contains an address. You may enter the desired address which will be displayed in the upper left window corner when you confirm your entry by pressing the <RETURN> key. All other window addresses remain unchanged.

The setting range is from 0 to 59.

If the window which is active at the time this menu item is activated does not have an address or if no window is opened a warning pops on the screen and the address to be entered will be used as a default value for further windows to be opened.

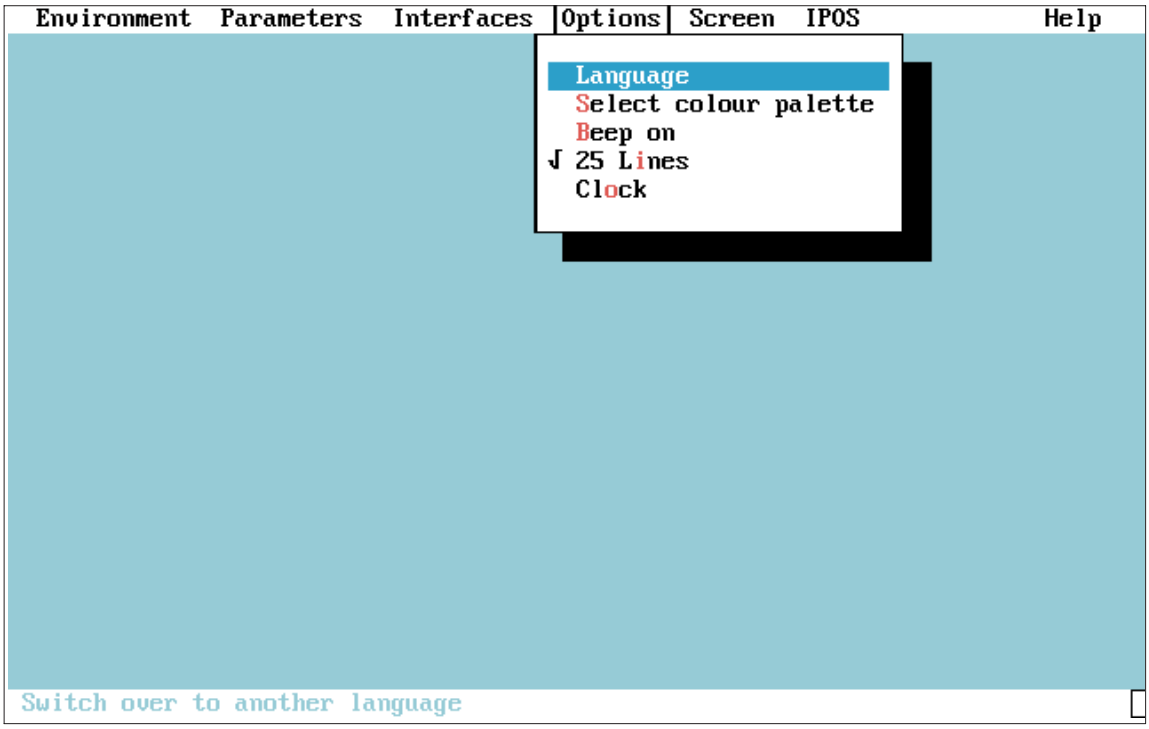
Clicking the address in the window corner will also display this input box.

The following illustration shows an individual menu window with an opened input box for address selection.



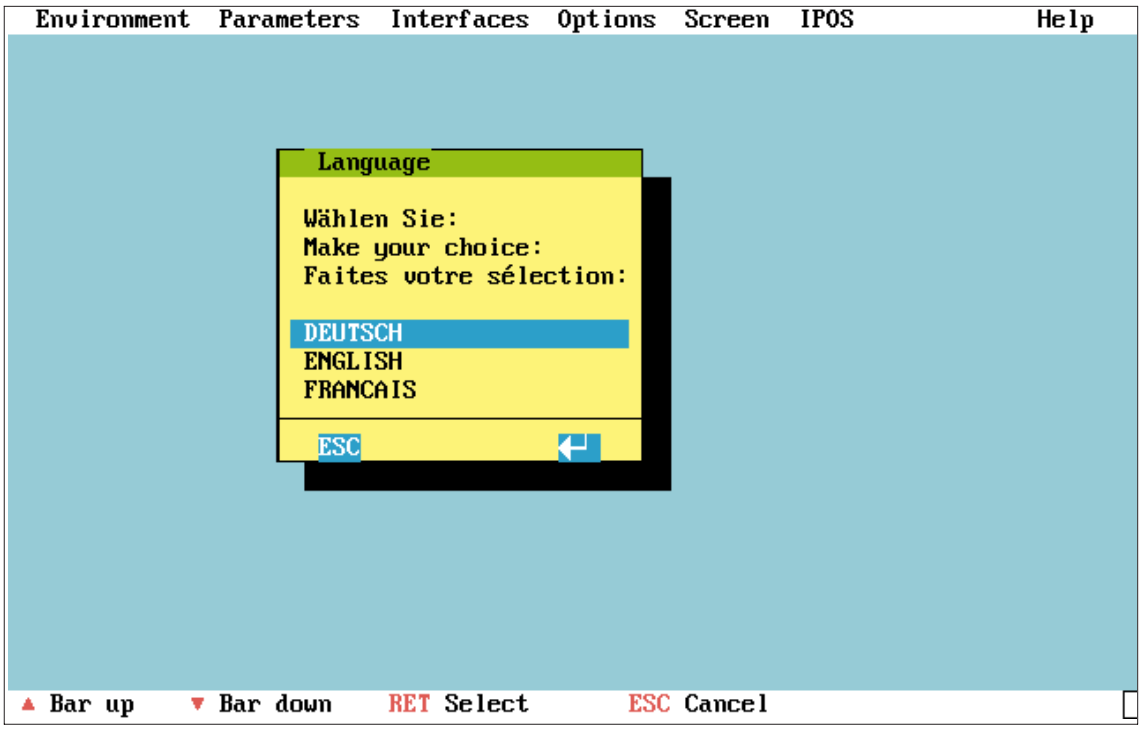
4.4 Menu option “Options”

This option includes features, which influence the program’s outward appearance. The settings effected in this option are saved to the MD_SHELL.INI file when the program is ended and used as initial values when the program is started again.



4.4.1 Menu item “Language”

On selecting this menu item a selection window will be displayed on the screen, where you can set the language to be used by the program. Once a certain language has been set, the menu, Help texts, status and fault messages are all displayed in that particular language. The program supports different languages. Each language is saved in a separate file, German, for example in the DEUTSCH.LNG language file, which is supplied together with your copy of MD_SHELL. The available language selection depends on the *.LNG files stored on your hard disk.



General description:

Type: System window	
Height	–
Move	X
Deactivate	–
Edit contents	–
Update	–
Assign address	–

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Activate language switchover
↑			Select language
↓			
F1	F1		On-line Help

4.4.2 Menu item “Select colour palette”

This menu item lets you select one of six possible colour palettes. One colour palette comprises 16 different colours. Selecting this menu item will display a selection window, where the active, currently used colour palette is marked. To choose a different colour palette move the selection bar to the palette of your choice. The change in colour will be visible immediately.

General description:

Type: System window	
Height	–
Move	X
Deactivate	–
Edit contents	–
Update	–
Assign address	–

Key	Button	Action
ESC	ESC	Close window
↑ / ↓		Select colour palette
F1	F1	On-line Help

4.4.3 Menu item “Signalsound on”

Turn this option on if you want your computer to notify you with a “beep” (visualized by a checkmark left of the menu item) when a parameter is sent from the PC to the AC servo controller. If not, turn it off.

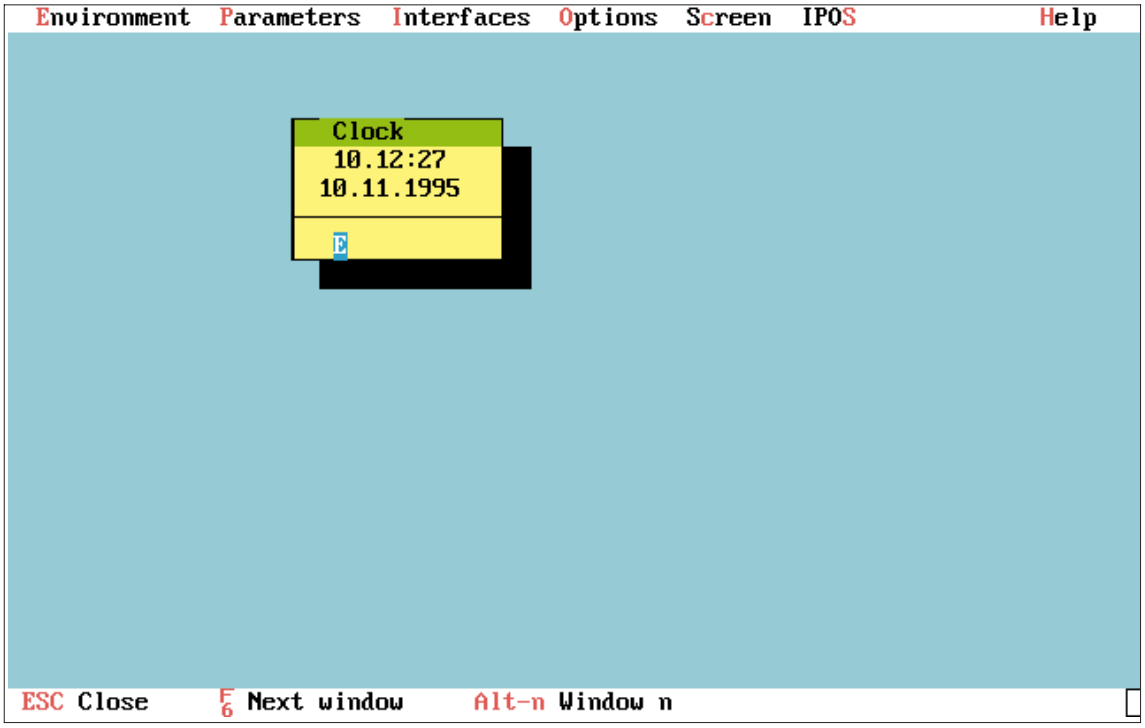
4.4.4 Menu item “25 lines”

This item allows you to change the screen display from a 25-line to a 50-line display. The former is identified by a checkmark left of the menu item.

CAUTION:
To ensure reliable program operation, do not change over the display while the program is running. It is better to do it immediately after program start. We strongly recommend, though, to enter the desired number of lines in the MD_SHELL.INI file prior to starting the program (for details please refer to section 3.1).

4.4.5 Menu item “Clock”

On selecting this menu item a window is displayed giving the current date and time.



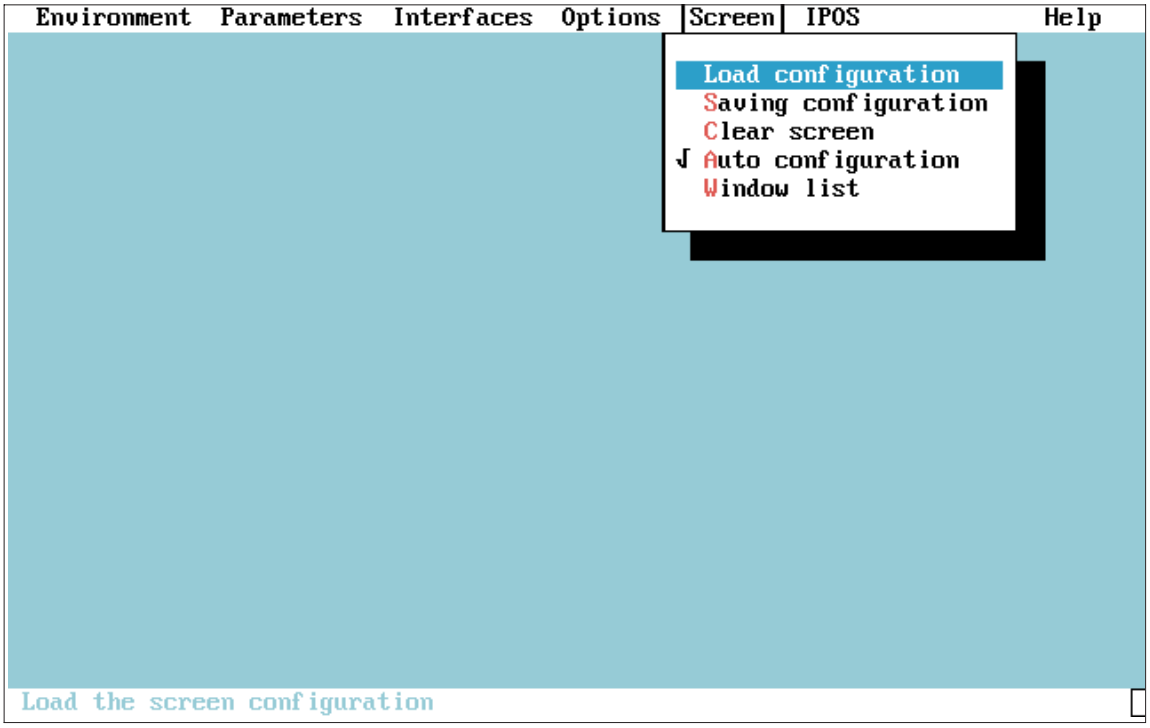
General description:

Type:	System window
Height	–
Move	X
Deactivate	X
Edit contents	–
Update	X
Assign address	–

Key	Button	Action
ESC	ESC	Close window

4.5 Menu option “Screen”

This menu item offers features which influence the way the windows are displayed on the screen.



4.5.1 Menu item “Load configuration”

When you select this menu item, your screen will be cleared completely and a previously saved screen configuration loaded onto your screen (please also refer to section 4.5.2). If no configuration has been saved yet, your screen will remain empty.

4.5.2 Menu item “Save configuration”

The menu item saves number, size and location of the windows currently displayed on your screen to the *.CFG file. Thus, this particular information is stored when you exit MD_SHELL. To retrieve this configuration, select menu item *“Screen/Load configuration.”*

4.5.3 Menu item “Erase display”

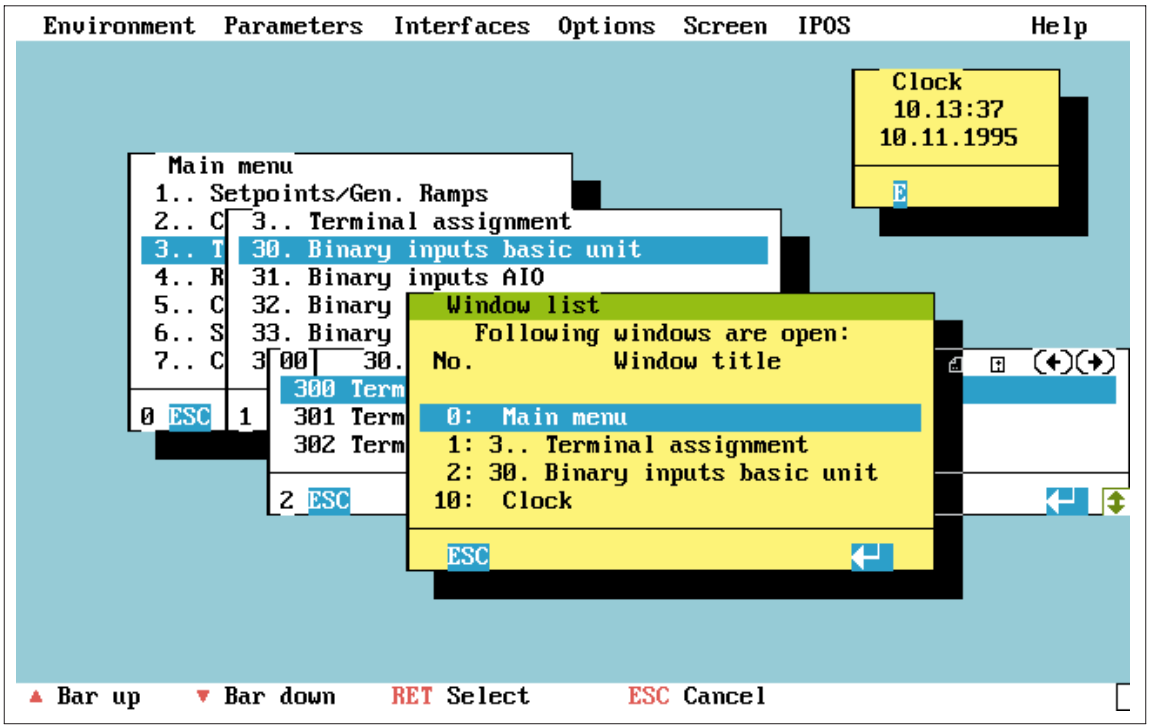
This feature removes all windows from your screen.

4.5.4 Menu item “Auto configuration”

This item activates the program’s auto configuration feature (visualized by a checkmark left of the menu item) or deactivates it. If activated, the screen configuration (all windows) displayed at the time you exit the program is loaded again when you restart the program.

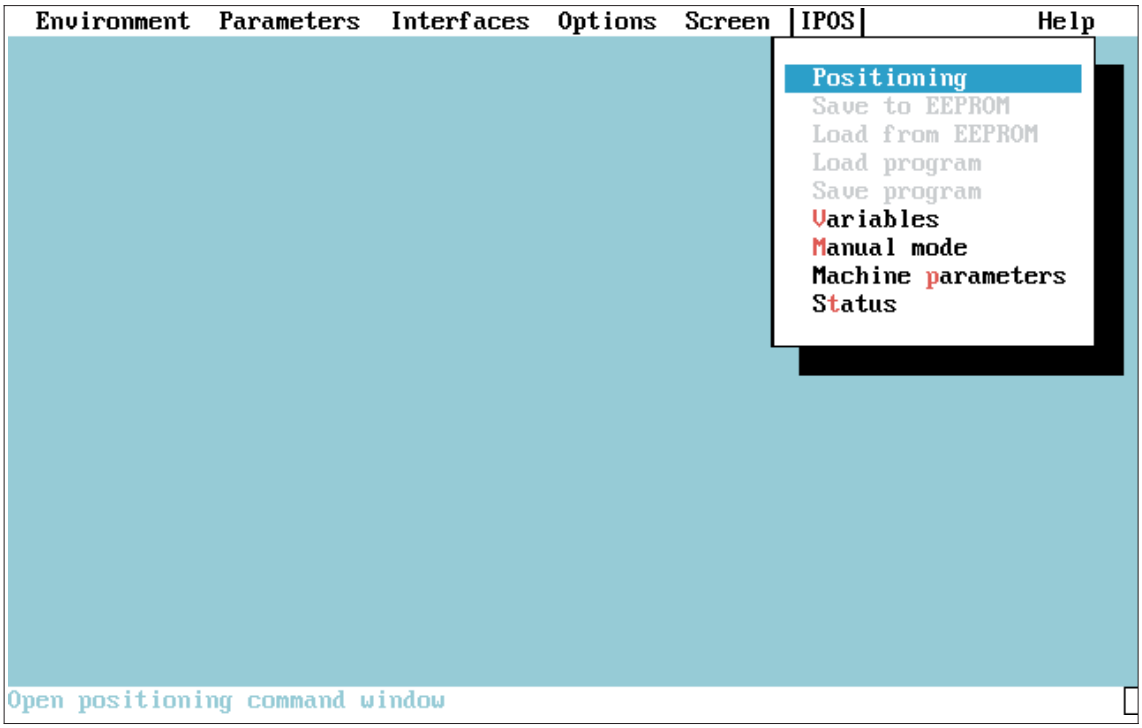
4.5.5 Menu item “Window list”

This feature creates a list of all currently open windows. Each line contains the number and the window header. Use the selection bar to activate a particular window (i.e. move it to the foreground of the screen).



4.6 Menu option “IPOS”

The IPOS menu title comprises the following functions:



This pull-down menu window contains the menu items which you need to operate the single axis positioning control of the servo controller. To activate any of these items the servo controller must be set at the “Positioning” mode.

There are two types of positioning:

1. Positioning with the automatic program
2. Positioning through manual input using a PC keyboard and the mouse.

The automatic program is processed in the “IPOS/Positioning” menu item. You may enter a program (mask-driven program entry to avoid syntax errors in the program), copy from/to the hard disk or a diskette (menu items “Load program” and “Save program”) or download and upload positioning programs to or from the EEPROM of the servo controller (menu item “Save to EEPROM” and “Load from EEPROM”).

The variables used in the positioning program can be displayed and edited in the “Variables” menu item.

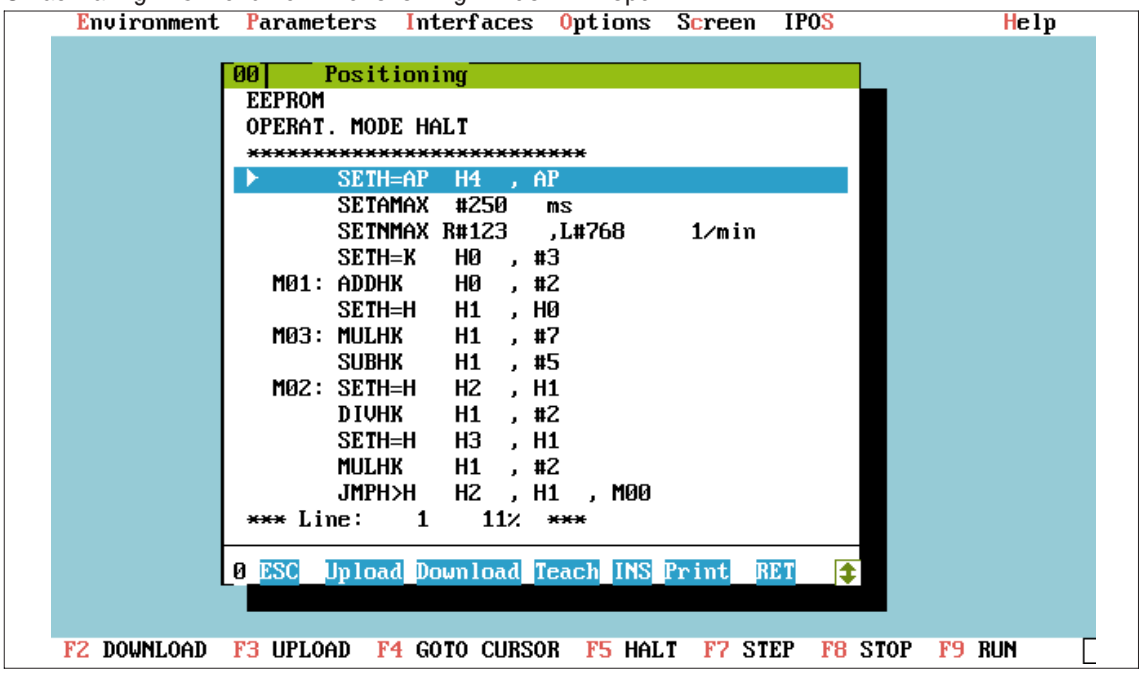
The “Manual mode” menu item is for positioning manually. On activating Manual mode a window will open, where you can enter travel distance setpoints for manual positioning, edit positioning parameters and read out status information about the positioning.

Important parameters for the positioning such as, e.g. travel distance units, software limit switches or the lag error window can be set in the “Machine parameters” menu item.

The “Status” menu item shows important display values during the positioning.

4.6.1 The menu item “Positioning”

On activating this menu item the following window will open:



Please note that you can open only one “Positioning” window.

The “ Positioning” window is made up of three sections:

– Two lines containing status information in the upper section. When the servo controller is uploading a program from the EEPROM or downloading a program to the EEPROM, the “EEPROM” line is marked with an x (see Section 4.6.2).

– The bottom line showing the number of the line which is currently highlighted by the selection bar (cursor) and the program code size (in percent of the maximum possible program code size).

– The lines with the actual program in the middle section. Please note the following when you use the positioning program:

1. The positioning program is always edited in local mode. Before you can edit a positioning program which is stored in the servo controller, you must first upload the program to the positioning window. (To load the program use the Upload function). There you can edit the program and then download it again to the servo controller.
2. Always complete programs are transferred, not single commands.
3. Incorrect entries in the positioning window (e.g. operand too large) are only detected during a down-load operation and then identified as error.
4. You can only download a program when the “Controller inhibit” is active in the servo controller.

A positioning program in the editable middle section of a positioning window comprises the following:

– Program code: This usually takes up the largest part of the positioning window. The program code is made up of the individual positioning program commands (travel commands, commands for terminal processing, commands for control of the program execution etc.), which are successively processed in the servo controller.

– The > character in front of a command (command pointer): MD_SHELL uses this pointer to mark the line with the command which is executed next. This marking is constantly updated while the positioning program is being processed. Please note however that in the case of programs which are processed fast not every single command may be marked.

– Variables: The 256 variables which can be used in a positioning program are displayed and edited in a separate window which can be opened via the “Variables” menu item.

– Table positions: The first 32 variables are used as table positions and can be used in conjunction with the corresponding IPOS commands.

Editing program lines:

To edit program lines in the “Positioning” window proceed as follows:

1. Position the selection bar on the line to be edited in the usual way.
2. Press the <RETURN> key or double click on the selected command. A selection window will open showing all available commands (grouped according to the type of command). The command to be edited is highlighted.
3. If you only wish to change the operands of a command, press the <RETURN> key to confirm the default command selection. An editing mask for the command to be changed will then appear on the screen showing the current operands.
   If you wish to edit the command itself, first select a new command from the selection window. The editing mask which will open after you have pressed <RETURN> then contains the new command with empty operands.
4. Use the <TAB> key to move to the individual input boxes in the editing mask. For each command the first input box of the mask is the jump flag (M). To delete an existing flag enter two spaces after the M.
5. When all the operands have the desired values, press the <RETURN> key to exit the input mask. The command which you have highlighted in point 1 is now shown in the positioning window with its new changed value. If you exit the input mask with the <ESC> key, the command highlighted in point 1 remains unchanged and is shown with its previous settings in the positioning window.
6. So far the change has only had an effect on the contents of the window on your screen. To make the change effective in the servo controller download the program to the servo controller and the change will be effective when the program is executed.

Inserting a program line:

To insert a program line in the positioning program in the “Positioning” window proceed as follows:

1. Position the selection bar. The command you wish to insert will be inserted at the bar position. The command which was at that position previously and all following commands will move down one line.
2. Press the <INS> key or click on the corresponding button with the mouse. The selection window with all the available commands will open.
3. Select the command you wish to insert. The editing mask which will open after you press <RETURN> then contains the new command with empty operands.
4. Use the <TAB> key to move to the individual input boxes in the editing mask. For each command the first input box of the mask is the jump flag (M). To delete an existing flag enter two spaces after the M.

5. When all the operands have the desired values, press the <RETURN> key to exit the input mask. The command which you have highlighted in point 1 is now shown in the positioning window with its new changed value. If you exit the input mask with the <ESC> key, the command highlighted in point 1 remains unchanged and is shown with its previous settings in the positioning window.
6. So far the change has only had an effect on the contents of the window on your screen. To make the change effective in the servo controller download the program to the servo controller and the change will be effective when the program is executed.

Deleting a program line:

To delete a program line from the positioning program in the "Positioning" window proceed as follows:

1. Position the selection bar.
2. Press the <DEL> key or click on the corresponding button with the mouse. The highlighted command is deleted and all following commands will move up one line.
3. So far the change has only had an effect on the contents of the window on your screen. To make the change effective in the servo controller download the program to the servo controller and the change will be effective when the program is executed.

Working with block commands:

You may copy, move or delete not only single program lines but also complete program blocks consisting of several successive program lines. To do this, highlight the corresponding program lines thus turning them into a "block". You may then proceed to edit the highlighted block.

Highlight block:

– <SHIFT>+arrow keys or <SHIFT>+mouse.The lines are now highlighted, indicated by a little box at the beginning of each line.

Copy block:

– Highlight block
– Position bar
– Press <Crtl-Ins>.
  The highlighted block is inserted at the bar position.

Move block:

– Highlight block
– Position bar
– Press <Shift-Ins>.
  The highlighted block is moved to the bar position.

Delete block:

– Highlight block

– Press <Crtl-Del>.
  The highlighted block is deleted.

Uploading a positioning program:

"Uploading" means transferring a positioning program from the memory of the servo controller (where the program is processed) to the "Positioning" window of MD_SHELL (where it can be edited).

To upload a program from the servo controller press the <F3> function key or click on the corresponding button with the mouse. Please note:

– Any positioning program opened in the positioning window will be overwritten. If you do not wish to overwrite the program in the positioning window, save it to the hard disk or a diskette before you upload a new program.

– If there is no positioning program in the memory of the servo controller or the positioning program is faulty, these program lines are shown as "ILLOP"(Illegal opcode) in the positioning window.

– When a program has been uploaded from the servo controller the jump flags shown in the window may be numbered differently than when the program is entered manually. The assignment of source line and jump destination remains the same of course.

– When the positioning window is opened, an upload is carried out automatically so that the program currently stored in the servo controller is displayed.

Downloading a positioning program:

"Downloading" means transferring a positioning program from the "Positioning" window of MD_SHELL(where it can be edited) to the memory of the servo controller (where the program is processed).

To download a program to the servo controller press the <F2> function key or click on the "Download" button with the mouse. Please note:

– You can only download a positioning program to the servo controller when the "Controller inhibit" is set in the servo controller.

– Comment lines are not saved in the servo controller and consequently cannot be displayed after an upload.

– A faulty program is not downloaded to the servo controller. Instead, a window is displayed on the screen, where the first error that has been found is shown together with the number of the command line affected.

– After a download the transferred program is always executed from its beginning. Independent of the location of the command pointer.

Teach-in:

In addition to being entered by hand, the operands of certain commands can also be specified by a teach-in procedure using the "Manual positioning" window.

The teach-in procedure can be used in conjunction with the positioning program-commands "POSAW" and "POSANW". The teach-in procedure is as follows:

1. In the “Positioning” window move the selection bar to a POSAW or POSANW command. The highlighted line will be changed by the teach-in procedure.

2. Press <ALT-F9> or click on the “Teach” button with the mouse to open the manual positioning window (see Section 4.6.7). If you have tried to process any commands other than the POSAW or POSANW commands, an error message will be displayed.

3. In the manual positioning window, you may now travel to any position (see Section 4.6.7 for details).The current actual position of the drive will be the new value of the operand of the command you are editing.
   While the manual positioning window is open, it is not possible to open any other windows or to activate the MD_SHELL main menu.

4. Press the <ESC> key. The manual positioning mode window is closed and the selected program line entered in an editing mask with the operand which has just been taught in by the teach-in procedure. If you wish, you may now edit the command further. To accept the command and transfer it to the positioning window, press the <RET> key. If you exit the editing mask with the <ESC> key, the positioning program will remain unchanged.

5. So far the change has only had an effect on the contents of the window on your screen. To make the change effective in the servo controller download the program to the servo controller and the change will be effective when the program is executed.

Controlling the execution of a positioning program

You may start or stop a positioning program, execute it up to a certain command or execute it in steps if you wish. To do this use the function keys as follows:

<F9> (RUN) starts the program. Program execution starts at the current position of the command pointer >.

<F8> (STOP) interrupts a running program. Program execution will be continued from this point if you press the <F9> function key.

<F5> (HALT) interrupts a running program. The command pointer is reset to the beginning of the program.

<F7> (STEP) the servo controller only executes the program line identified by the command pointer > (single step).

<F4> (GOTO CURSOR) starts the program the same as <F9>. Program execution is interrupted at the program line highlighted by the selection bar. The command highlighted by the selection bar is not processed any more, a highlighted table position not reached.

Printing a positioning program

To print the program shown in the “Positioning” window press <ALT-F8> or click on the “Print” button with the mouse. You may also print the data to an ASCII file and open it with an editor.

General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	in part
Assign address	X

4.6.2 The menu item "Save to EEPROM"

The servo controller has two types of memories to which a positioning program can be saved:

1. EEPROM (non-volatile memory): The positioning program saved to this memory is permanently stored also in the event of a power-down.
2. RAM (volatile memory): Anything stored in this memory will be lost in the event of a power-down. For a positioning program to run it must be in the RAM.

Any program downloaded from MD_SHELL to the servo controller is loaded to the RAM. To store a program permanently so that it will be available even after a power-down, you have to save the program to the EEPROM. To do this use the " Save to EEPROM" menu item. Please note the following:

– A positioning program stored in the EEPROM will be overwritten with the new program.

– An "X" after "EEPROM" in the top line of the "Positioning" window indicates that the program is being copied to the EEPROM.

– This menu item can only be activated if the "Positioning" window is open.

4.6.3 The menu item " Load from EEPROM"

To run a positioning program that is stored in the EEPROM, you have to load it to the RAM of the servo controller (see Section 4.6.2). To do this use the "Load from EEPROM" menu item. Please note the following:

– After power-up the program is automatically copied from the EEPROM to the RAM of the servo controller.

– An "X" after "EEPROM" in the top line of the "Positioning" window indicates that the program is being copied to the RAM.

– This menu item can only be activated if the "Positioning" window is open.

4.6.4 The menu item “Load program”

Use this menu item to load positioning programs stored on the hard disk or on diskette to the positioning window.

Please note the following:

– Before you can run a program that has been loaded to the positioning window you must first download it to the servo controller.

– This menu item can only be activated if the “Positioning” window is open.

4.6.5 The menu item “Save program”

Use this menu item to save a positioning program in the positioning window to the hard disk or a diskette.

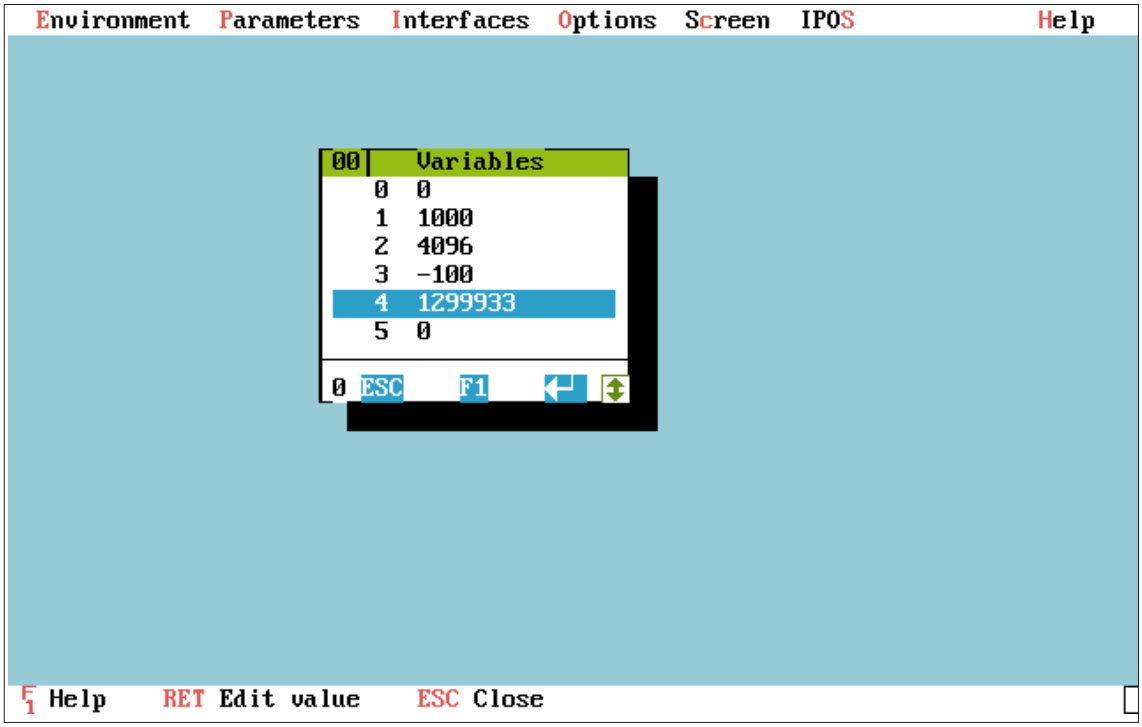
Please note the following:

– The “Save program” command saves the program shown in the positioning window - not the program stored in the servo controller - to the hard disk or a diskette. If you wish to save the program stored in the servo controller to the hard disc or a diskette you must first upload it to the positioning window.

– This menu item can only be activated if the “Positioning” window is open.

4.6.6 The menu item “Variables”

On activating this menu item the following window will open:



The Variables window shows the 256 variables which can be used in a positioning program. The values of the different variables can be edited in the usual way.

These variables are temporary variables, they are lost when the servo controller is switched off.

General description:

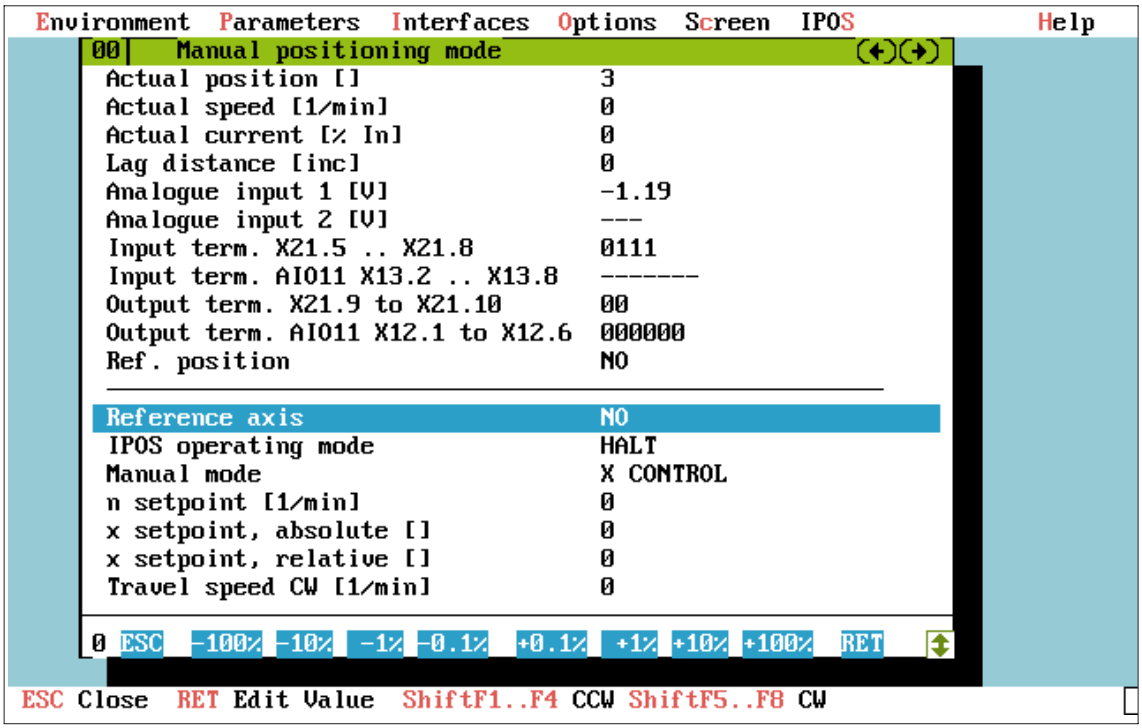
Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

Key	Button		Action
ESC	ESC		Close window
↵	↵	or double-click	Edit variables
↑			Move bar up
↓			Move bar down
F1	F1		On-line Help

4.6.7 The menu item "Manual mode"

When in manual mode, you can use the servo controller to position directly, i.e. without a positioning program.

On activating the *"Manual mode"* menu item the following window will open:



The “Manual positioning” window is divided into 2 sections:

The values shown in the upper window half are display values which cannot be edited. They show important positioning status information such as actual position or actual speed.

The lower half contains the parameters which are needed for single-axis positioning with MD_SHELL.

Two different positioning modes are available: “n control” (speed control) and “x control” (position control). In the speed control mode the drive will travel clockwise or counterclockwise with a specified speed setpoint for as long as you press the corresponding key combination on the keyboard of your PC or click on the appropriate button with the mouse.

In the position control mode the target position is specified to which the drive will travel automatically after you have entered a position setpoint (absolute or relative in relation to the current actual position).

How to use the position control mode

1. Open the “Manual positioning” window. The servo controller must be set at “Positioning” mode (parameter 100) and be “enabled”. The 7-segment display on the axis must show an “A”.

2. Set the positioning mode in the “Manual positioning” window at “MANUAL MODE”. The “Manual mode” parameter must be set at “x control”.

3a. Set the “x setpoint, absolute” parameter to the desired target position. Press the <RET> key to confirm your entry, the edited x setpoint will then be sent to the servo controller and the unit will position accordingly.

3b. As an alternative to 3a. you may also position relative to the current actual position. To do this you have to edit the “x setpoint” parameter. The edited value is added to the read actual position of the servo controller and the result sent to the servo controller after you have pressed the <RET> key. The servo controller will then position to the specified position.

How to use the speed control mode

1. Open the “Manual positioning” window. The servo controller must be set at “Positioning” mode (parameter 100) and be “enabled”. The 7-segment display on the axis must show an “A”.

2. Set the positioning mode in the “Manual positioning” window at “MANUAL MODE”. The “Manual mode” parameter must be set at “n control”.

3. In the “n setpoint” parameter set the desired positioning speed.

4a. Click on one of the buttons “-100%” to “+100%” to start positioning. Negative values are for counterclockwise travel, positive values for clockwise travel.

100% means that the servo controller will travel at the speed specified in 3. 0.1%, 1% and 10% are percentage values of the speed for more accurate positioning. The motor will continue to rotate for as long as the mouse button is depressed. When you release the mouse button, a setpoint of zero is sent to the servo controller and the motor will stop.

4b. As an alternative to 4a. the servo controller can also be operated from the keyboard: Key combinations <SHIFT-F1> to <SHIFT-F8> correspond to the “-100%” to “+100%” buttons. Please note that the motor will only start once you press the “SHIFT” key and then afterwards, in addition, one of the function keys <F1> to <F8>. The motor will stop as soon as you release the Shift key, independent of the function keys.

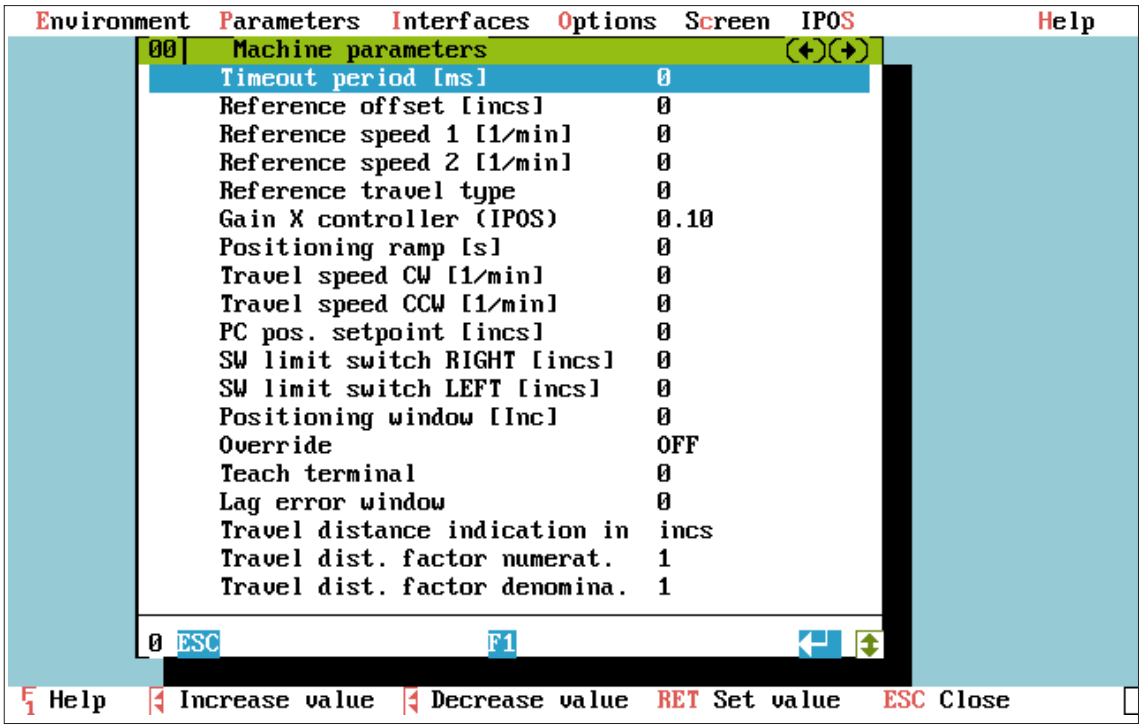
General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

Key	Button	Action
ESC	ESC	Close window
↵	↵	Edit parameters
↑		Move bar up
↓		Move bar down
F1	F1	On-line Help
Shift F1	-100%	100% CCW travel
:	:	:
Shift F4	-0.1%	0.1% CCW travel
Shift F5	+0.1%	0.1% CW travel
:	:	:
Shift F8	+100%	100% CW travel

4.6.8 The menu item "Machine parameters"

On activating this menu item the following window will open:



Please refer to Section 4.2.2.2 for details on how to operate this window.

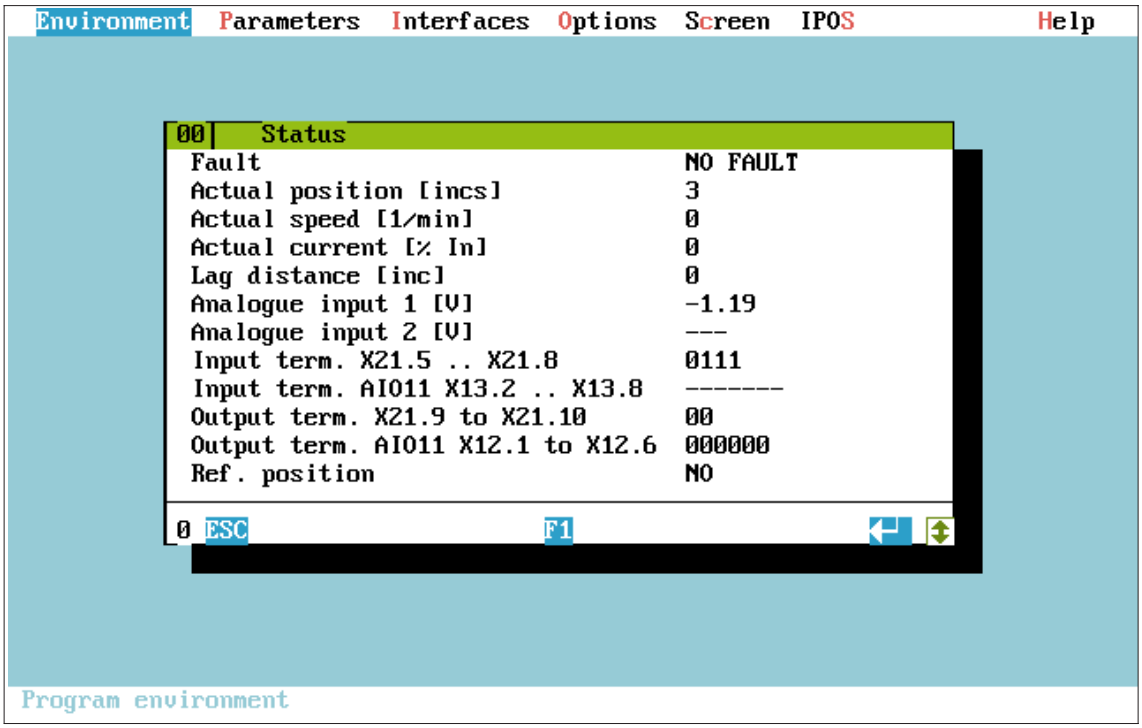
General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	X
Update	X
Assign address	X

Key	Button	Action
ESC	ESC	Close window
↵	↵ or double-click	Edit parameters
←	(←)	Decrease parameter value
→	(→)	Increase parameter value
↑		Move bar up
↓		Move bar down
F1	F1	On-line Help

4.6.9 The menu item “Status”

On activating this menu item the following window will open:



The status window shows display values which cannot be edited.

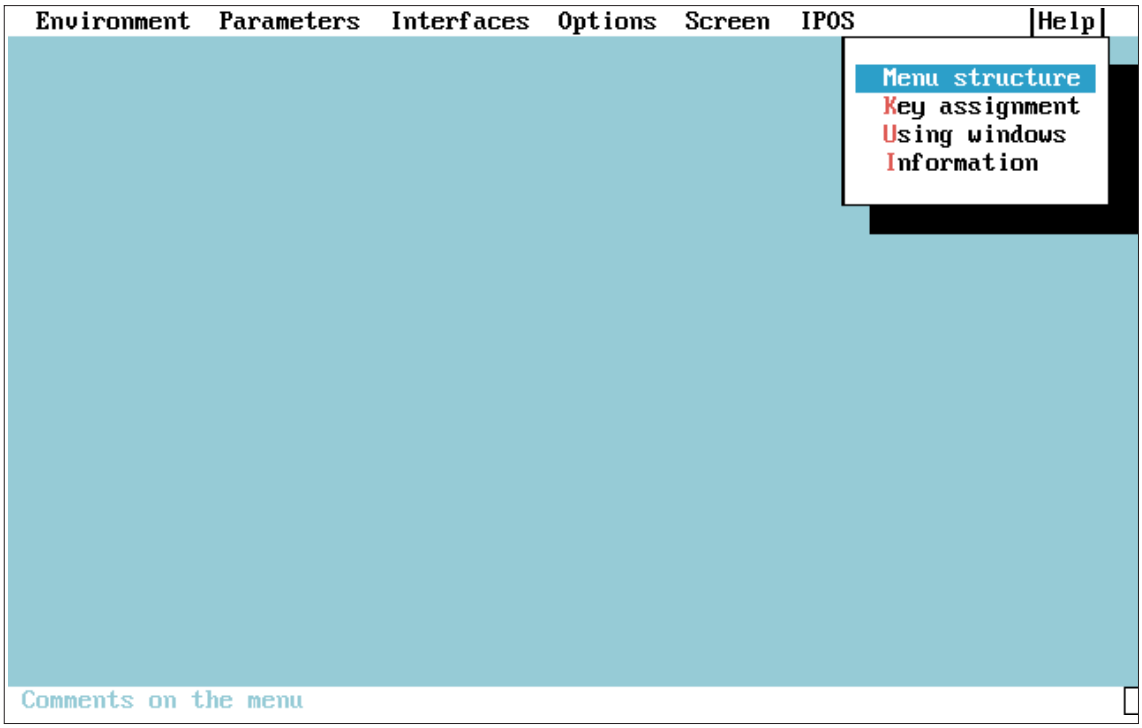
General description:

Type:	Application window
Height	X
Move	X
Deactivate	X
Edit contents	–
Update	X
Assign address	X

Key	Button	Action
ESC	ESC	Close window
F1	F1	On-line Help

4.7 Menu option “Help”

This menu option includes the following features:



Selecting one of the following menu items will start the program-integrated Help feature. If you want to know more about the Help feature and how to use it, please refer to section 6.

4.7.1 Menu item “Menu structure”

This menu item provides short information on the menu options displayed in the menu line.

4.7.2 Menu item “Key assignment”

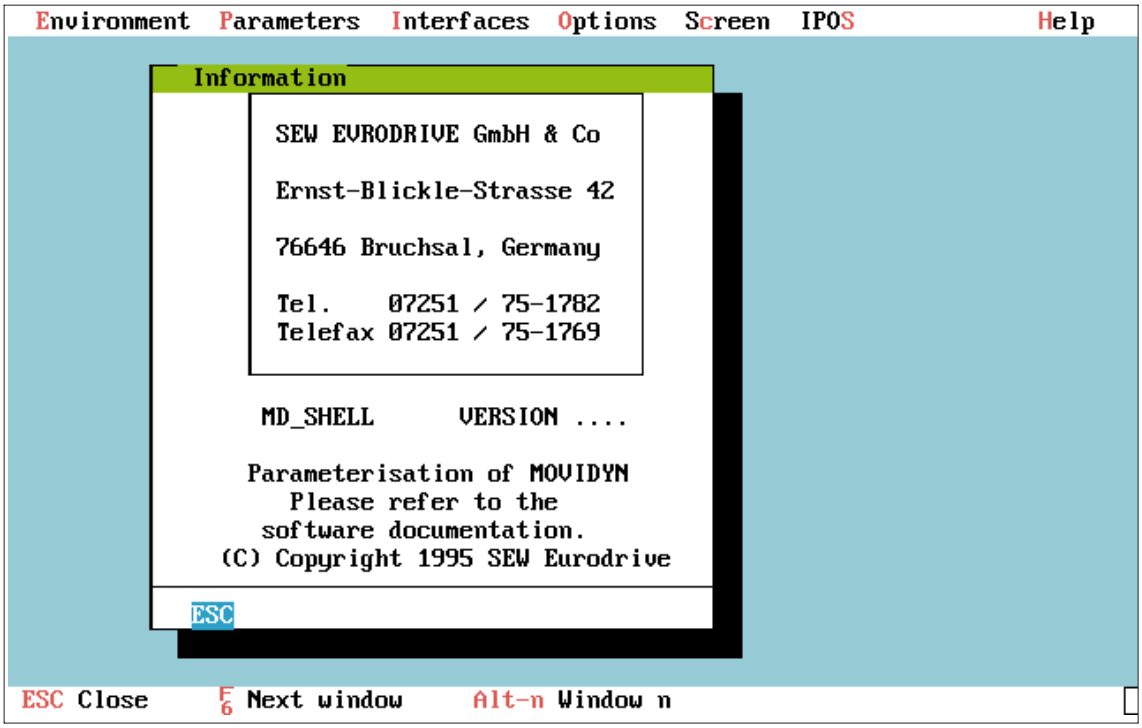
This menu item provides information on relevant keys and buttons for each window of the program. To select a window use the <TAB> key and press <RETURN> to display the pertinent Help text. The on-screen Help text always provides information on the opened window. If no window has been opened, the Help window contains a general Help text.

4.7.3 Menu item “Using windows ”

This menu item explains how to manipulate the MD_SHELL windows.

4.7.4 Menu item “Information”

This menu item informs you on the programs version number and a telephone number which you can call if you need further information on the program.



General description:

Type:	Application window
Height	–
Move	X
Deactivate	X
Edit contents	–
Update	–
Assign address	–

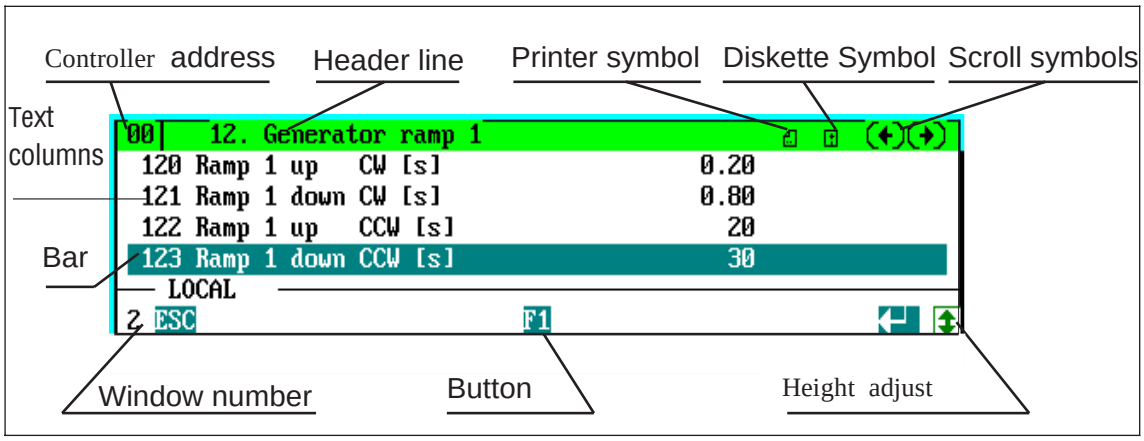
Key	Button	Action
ESC	ESC	Close window

5. Window functions

Communication between the user and the AC servo controller is via windows, where all entries are made and message and data reported back from the AC servo controller. In principle, these windows have more or less the same structure, and, with the odd exception, can be manipulated the same way.

5.1 Window structure

Each window is composed of a certain number of elements with the following arrangement and function:



Height adjust: Displayed for all windows whose vertical extension (height) can be changed (please refer to section 5.5).

Scroll icon: Displayed for all windows containing parameters that can be changed. Clicking the symbol will decrease or increase the selected parameter.

Printer icon: Displayed for all windows containing parameters that can be printed out. Moving the mouse pointer to this symbol will start a copying process with printout of a complete parameter file (please refer to sections 4.1.3, 4.2.2.2).

File icon: The file icon basically corresponds to the printer icon except that a parameter file is copied to a file (on a hard disk or diskette).

Window number: Each opened application window is assigned a consecutive number in order to be able to tell windows (in particular of the same type) apart. The key combination ALT <nr> with <nr> being the window number will activate a certain window (please also refer to section 5.3.).

AC servo controller address: Address of the AC servo controller from which the parameters appear in this window.

Header line: This line at the upper window border gives the designation of the window opened. The colour of the header line will tell you whether a window is active or in a different mode (please refer to sections 5.5, 5.6). By clicking the header line with the mouse you can move the window across the screen.

Buttons: When you click a button with the mouse, the program will carry out an action assigned to this particular button. A certain key is assigned to each button. The action initiated by the key and the pertinent button are the same. The content of each button determines its function. The following buttons and keys have the same effect:

Button	Key
[ESC] or [E]	<ESCAPE>
[↵] or [←]	<RETURN>
[F1]	<F1>

Bar: Windows offering the user several alternatives for selection with which he can influence further program operation or containing several files have a selection bar. You can move this bar within the window using the mouse or with the keyboard to any (depending on the window) line or column (please refer to section 5.7).

Text columns: Text columns contain constant or variable text for a special menu feature.

Some of the keys with which you can influence an active window are displayed at the bottom of the screen.

5.2 Screen functions

The user interface allows you to open several windows or the same window several times. A maximum of 15 windows (some either completely or partly covered up) can be displayed at the same time. To modify variables displayed in a window (e.g. edit parameters) or to change the window's size or on-screen location, the window is to be activated beforehand. You can tell an active window by its green header line. There are several ways of activating a window:

1. Click the (visible) interior of a window with the mouse. If a window is partly concealed, after activation it will be displayed in its full size as the topmost window. To activate windows which are completely concealed use the second method.
2. Select the desired window by using the key combination <ALT> <nr> with "nr" being the number of the window. This method allows you to activate even completely concealed windows.
3. Using the <F6> key you can activate the windows one after another.
4. The window last opened will always be the currently active one.

5.3 Opening a window

To open a window you either select a certain menu item, press a key or click a button (i.e. Help windows) or these are displayed when certain program conditions prevail (fault windows). Windows, which are not of a system-specific nature, are assigned a window number, which is displayed in the lower left window corner. The <ALT> <nr> key combination gives you the ability to open a maximum of 10 application-specific windows. In addition, another 5 system-specific windows, such as for example Help windows, fault windows, clock window, etc. may be opened. Size and on-screen location of an opened window are determined by the size and location this window had before it was last closed (please refer to section 5.4).

5.4 Closing a window

To close active windows press the <ESCAPE> key or click the [ESC] button. Fault windows are the exception, they are closed by the program itself as soon as the cause of the fault has been eliminated.

When a window is closed, its current size and on-screen location are saved, i.e. when reopened the window will be displayed in exactly the same size and at the same location. This feature works only per window type. If two or several windows of the same type are opened (e.g. two windows “palette selection”) only the window data of the last closed window of this type are saved.

5.5 Height adjustment

If you wish to open several windows at the same time and also want to avoid that these windows cover each other up, you can change a window’s height. Windows whose height can be manipulated, are identified by a height symbol in the lower right corner of the window (please refer to section 5.1). Click the height symbol and simultaneously press the left mouse button and move the mouse pointer vertically. This will change the window’s height. If you are using the keyboard, set the window to “height mode” by pressing <CRTL><F5>. When you are in this mode, the contents of your window are displayed in a different colour. Now you may change the window height by using the key combination <SHIFT><UP ARROW> or <SHIFT><DOWN ARROW>. To return to your window’s previous mode press the <RETUTN> key (please also refer to section 5.6).

5.6 Moving windows

To make the most of the available screen space, a feature has been included that allows you to change the location of a window. To move the window click the header line of the respective window with your mouse, simultaneously press the left mouse button and move the mouse pointer to the screen location where you want to have your window placed.

When using the keyboard activate the “move mode” by pressing <CRTL><F5>. The window’s contents will now be displayed in a different colour. Then move the window to the desired location using the arrow keys. To deactivate the “move mode” press the <RETURN> key (please also refer to section 5.5).

5.7 Modifying window contents

Apart from the features described so far, there are also features which let you influence the contents of a window. Unlike the features described above, the following ones greatly depend on the contents of the respective window, i.e. the selected menu item.

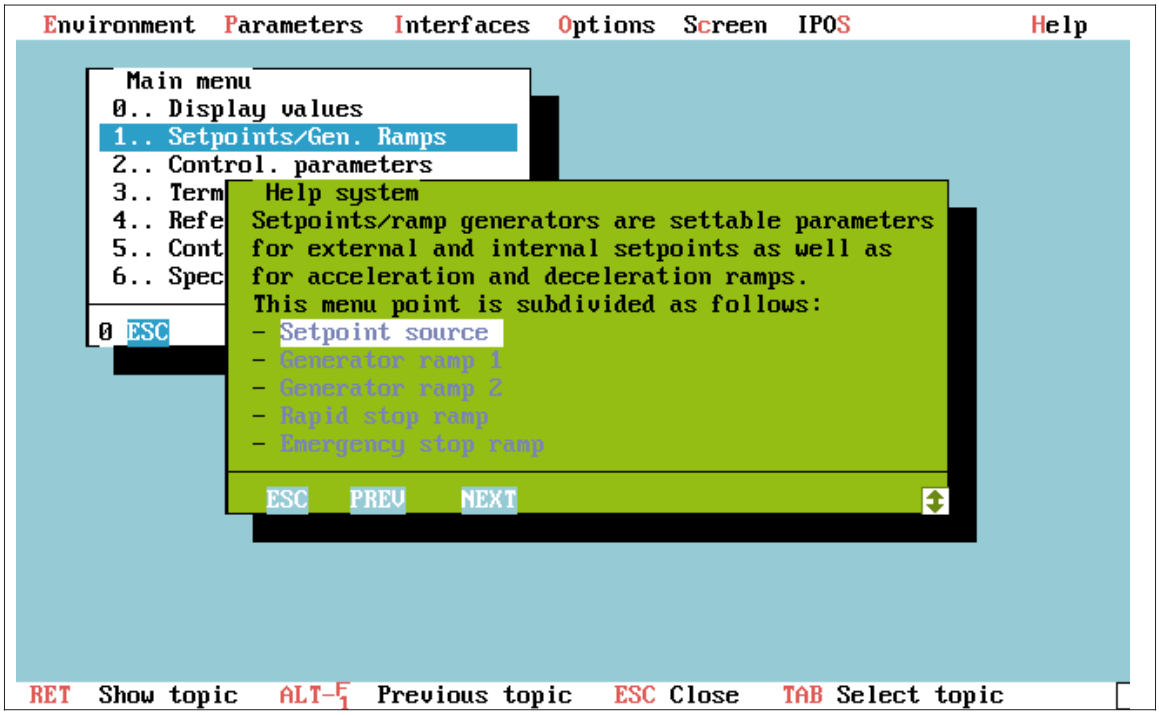
Moving a bar

Most of the program windows have a bar with which to select a certain alternative or a desired parameter. Use the <UP ARROW> and <DOWN ARROW> keys to move the bar right to the upper or lower border of the window. Using the mouse move the mouse pointer to the respective line, press the left mouse button and then, while pressing the left mouse button, drag the mouse pointer to the upper or lower window border.

Windows where parameters are displayed in parallel text columns have a bar which can be moved both vertically and horizontally. To move the bar horizontally either press the <TAB> key or move your mouse pointer to the respective text column and press the left mouse button.

6. The integrated Help utility

To obtain fast, reliable and readily available Help when using the program an on-line Help utility has been integrated, which provides helpful information depending on the current program status. To activate Help press <F1> and a Help window with the following structure will be opened:



The topic in the first line of the window refers to the program status active when Help was called up. Words displayed in a different colour cross-reference more general or more detailed Help topics, where you will find additional information. Use the <TAB> key to switch to the next referenced topic. The selected cross-reference is shadowed in colour. Press <RETURN> or the <F1> key to open a new Help window, which will provide information on the selected topic. The sequence of the opened windows is saved internally. To return to the previous Help window press <ALT><F1> or click the [PREV] box with the mouse.

This mechanism allows you to get either more general or more detailed information about any topic or to understand how different topics are interlinked.

To exit Help click the [ESC] box or press the <ESCAPE> key and the Help window will be closed again.

General description:

Type: System window	
Height	X
Move	X
Deactivate	X
Edit contents	–
Update	–
Assign address	–

Key	Button	Action
ESC	ESC	Close window
↵ F1	NEXT	Open next Help window on highlighted topic
↑		Scroll window up
↓		Scroll window down
→|		Go to next highlighted topic
ALT F1	PREV	View previous Help window

7. Index

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