AdvancEd User Reference Manual

Version 1.05

Contents

1. Description of AdvancEd environment

1.1 Purposes and application areas

AdvancEd is intended to develop and verify NC flow programs of any ISO-7bit version (ISO-6893, DIN-66025). During the work it delivers context-dependent help, concerned with the syntax and command set of some concrete ISO-7bit version. It carries out syntactical and, partly, semantic checking of flow program blocks, being inputted. AdvancEd makes it possible: to create flow programs; to assemble them from ready-made blocks; to introduce changes into earlier flow programs, developed with the help of CAM-systems; to verify the tool trajectory.

AdvancEd could be either resident in the NC system or some independent system in the department, developing flow programs.

2. Setting and starting AdvancEd

2.1 Setting AdvancEd

For installation it is necessary to start the file setup.exe and follow instructions of the setting wizard. The setting program is described in the file "Setting_NC_ Editor.doc", which is included into the setup kit.

2.2 Short description of AdvancEd files

When the installation procedure is finished, there is created the structure of folders with the following subdirectories.

BIN	contains executive *.exe files, dynamic *.dll libraries and ActiveX *.ocx components;
CFG	the subdirectory of setup files;
ENU	the subdirectory of files, supporting the English language;
ENU\BMP	the subdirectory of files with context graphical help in the English language;
DEU	the subdirectory of files, supporting the German language;
DEU\BMP	the subdirectory of files with context graphical help in the German language;
RUS	the subdirectory of files, supporting the Russian language;

RUS\BMP	the subdirectory of files with context graphical help in the Russian language;
NCS	the subdirectory of flow program files.

During its work AdvancEd uses the following files.

ncedtcln.exe	the executive file of the program;
cfgedit.exe	the executive file *.cfg of the editor of configuration files;
*.ini	the file of parameters, setting AdvancEd up. It can be defined like a parameter at starting the program. If the file is not defined so, there is used the file NcEdtCln.ini in the directory Windows.
*.cfg	the file, setting AdvancEd up for the concrete version of the flow program language. It must be defined like a parameter sCfgFile= either in the *.inii file, or in the command line. If such a parameter is absent, the editor tries to use the file "..\cfg\andronic_400_enu.cfg";
*.bmp, *.wmf	files of the context graphical help;
*.hlp, *.cnt	files of the help subsystem;
*.doc	documentation files;
*.ncs, *.cnc, *.nc	flow program files;
*.ipd	files of the interpolator data.

2.3 Starting AdvancEd

After installation of AdvancEd with the help of the installation program, it is possible to start the program by means either the menu Start or the icon on the desktop (if the icon has been created).

It is also possible to start AdvancEd from the command line. For this purpose: click the button Start and choose the command Run; write in the text field Open, the command NcEdtCln.exe, starting the program. In this case it is possible to use parameters, defined in the command line. To get help for parameters, use the key /?.

If starting without parameters, the editor uses the file NcEdtCln.ini for setting up. At the first start the editor creates this file with parameters, used by default. It also tries to use the configuration file «..\cfg\andronic_400.cfg», which sets up the language of flow programs. If such a file is absent, it is possible to work only in the

text editor mode, without inputting flow program blocks from the panel and without using graphical help.

2.4 Parameters of the command line

When starting AdvancEd from the command line, the following parameters and keys can be used.

NcEdtCln.exe [/?] ["edit file"] [/c"cfg file"] [/i"ini file"] [/s###x###] [/l] [/v] [/p]

/?	- it is used to get help for parameters and keys, used in the command line;
edit file	- the name of the file, which will be edited;
/c	- there is defined the name of the file, which sets up the concrete version of the flow program language;
cfg file	- the name of the file with the extension *.cfg. If the extension is absent, it will be added.
/i	- there is defined the name of the file with setup parameters of AdvancEd.
ini file	- the name of the file with the extension *.ini. If the extension is absent, it will be added.
/s###x###	- the size of the program window; ### - the number, defining the horizontal and/or vertical size in pixels. The program works with fixed window sizes 800x600 and 1024x768 pixels. It is possible to enter only values of a horizontal size. For example (/s1024 instead of /s1024x768).
/l	-in this mode it is possible to work with only one document. There will be changed values of keys F9 and F10 to finish the work and to save the program. This condition is used at operation on NC system.
/v	-the prohibition for changing the text of the flow program; It is impossible to save an active file with the same name.
/p	-printing the file, defined by the parameter "edit file" without starting the application.

Parameters, which are in square brackets [], are not obligatory.

Short file names could be defined without quotation marks; but long names, especially with blanks, must be enclosed in double quotation marks.

3. Work in AdvancEd environment

In the process of work with AdvancEd a user can do the following:

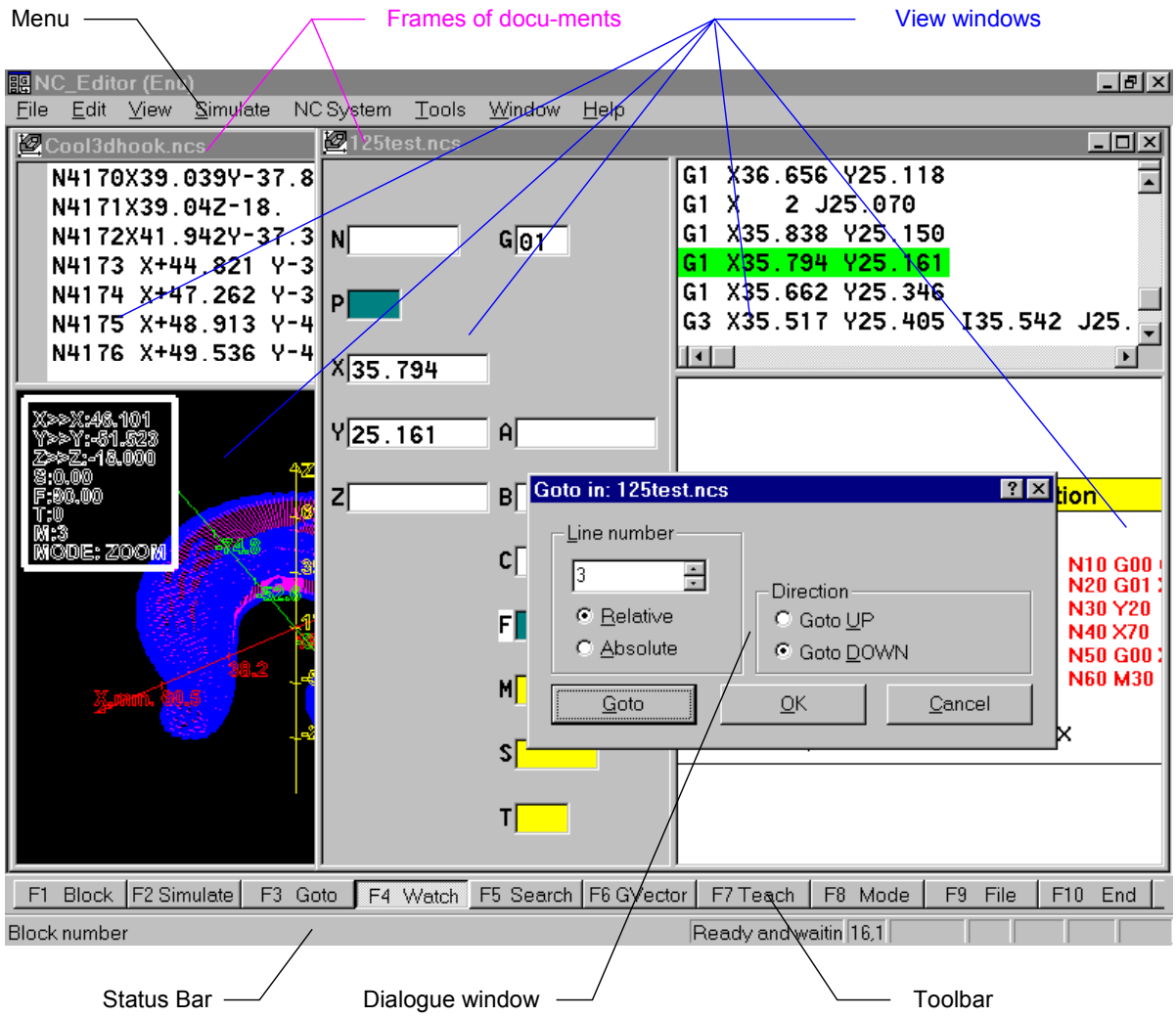
- to load the file (to create a new file) of the flow program;
- to edit flow program blocks;
- to load (or to save) groups of the flow program blocks;
- to print the text of the flow program;
- to receive blocks of the flow program from the NC system;
- to simulate the tool trajectory in order to estimate results of work;
- to save the flow program in the same (or in some new) file.

3.1 User interface

AdvancEd has an interface of the standard multi-document Windows-application (permitting to edit several documents concurrently). The interface includes:

- display windows, intended: to edit flow programs, to reflect the context reference information or the contents of the interpolation data file;
- document frames, uniting display windows for the given document;
- context-dependent ToolBars and menus, intended to choose the work modes and initiate commands;
- the Status Bar, reflecting information about the process of editing;
- dialogue windows, intended to accept setups and parameters of complex commands.

AdvancEd commands could be initiated with the help of either the menu or Toolbars. The menu contains the whole set of ToolBar commands.



Pic. 1 User interface

3.1.1 Windows and documents

Two types of files are documents for AdvancEd: (see Short description of AdvancEd files):

- files of ISO-7bit flow programs;
- files of the interpolator data.

During the work it is possible to open and close documents of both types; but only files of flow programs could be created, modified and saved at the disk. There is a possibility to work with the document contents in view windows, united in the frame of the document (see א). The number and purposes of view windows depend upon the chosen mode for this document (see AdvancEd modes).

AdvancEd does not have constraints, connected with the volume of the file of the flow program document. But one thing should be taken into consideration: to

work with the document of large volume means to have twice more free space at the disk as compared with the volume of the document itself. When opening the document of the flow program, it is assumed, that it has the standard text format, i.e. it consists of lines with «CR LF» at their end. AdvancEd admits also, that the lines are finished with symbols «CR», «LF», «LF CR». At opening such documents, they are being transformed into the standard text format with «CR LF» symbols (ASCII value of the symbol CR is 0x0D, and the value of the symbol LF is 0x0A).

A new document of the flow program is being create by the menu command «File>New». The existing document could be opened with the help of the menu command «File>Open». The document could be chosen from the list of documents, having been previously opened, - «File>1 File1.NCS», «File>2 File2.NCS». It is possible to do it either with help of the menu or with the help of the toolbar managing the file sytem, this ToolBar must be invoked with the help of either the “F9” key or the corresponding button of the standard control panel.

At the first start AdvancEd is being registered like an application, opening files with extensions *.ncs and *.ipd; this makes it possible to open such files from windows, Explorer and File Manager. The document of the flow program, being edited, could be saved with the same name by the menu command «File>Save»; it could be also saved with some other name by the menu command «File>Save as...». It could also be done with the help of the dialogue window, intended to load and save the edited file. The document could be closed either by the menu command «File>Close» or closing the frame of the document. Menu command «File>Exit» exits AdvancEd. The position of document frames at the screen could be arranged in the following way:

- like a cascade, by the menu command «Window>Cascade»;
- like vertical mosaic, by the menu command «Window> Tile vertical»;
- like the horizontal mosaic, by the menu command «Window> Tile horizontal».

The document frame could be chosen from the list of frames, having been previously opened, - «Window>1 File1.NCS», «Window>2 File2.NCS».

3.1.2 ToolBars and menu

ToolBars are context-dependent both on the document type (see Windows and documents) and the work mode (see AdvancEd modes). The corresponding

ToolBar is being loaded, when opening a document or changing a mode. Activity of corresponding keys depends upon the mode. The commands could be initiated in one of three ways:

- by clicking the mouse at the corresponding key;
- by pushing the corresponding functional key «F1» ... «F10»;

Keys of ToolBars could be divided into two groups: keys-commands and keys-flags. If the key-command has been pushed, it sinks for some time and the corresponding command is being initiated. The state of the key-flag (is sunk, is not sunk) reflects some mode or activity of the corresponding dialogue.

Switching ToolBars on-off is carried out by the menu flag «View>Toolbar».

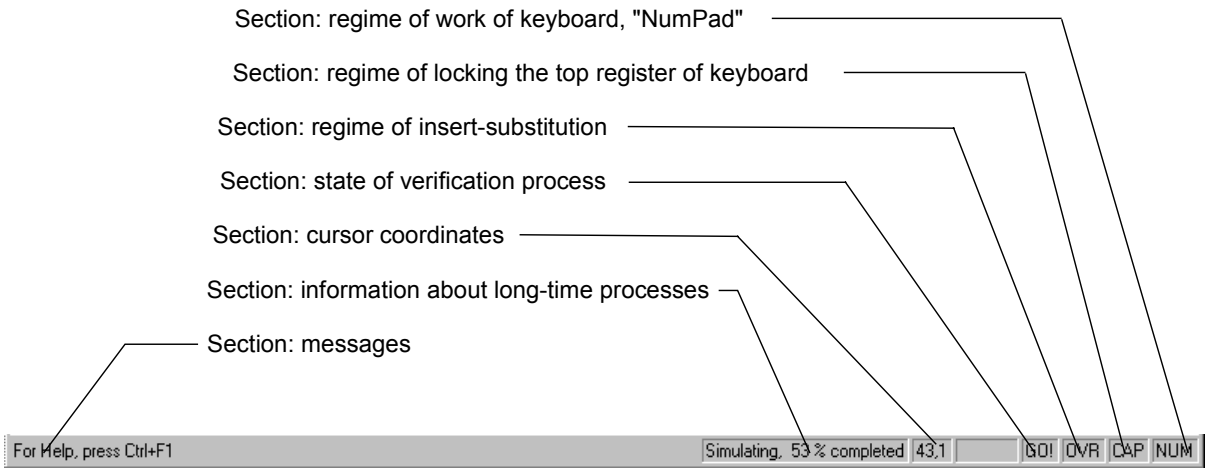
The AdvancEd menu contains the full set of ToolBars' commands, duplicating such commands. The menu is also context-dependent on the document type (see Windows and documents) and the work mode (see AdvancEd modes). The type of the document defines, whether corresponding commands are present or absent; and the work mode defines activity of such commands.

Like keys of ToolBars, the items of the menu could be divided into two groups: items-commands and items-flags. the behavior of these groups is the same as the behavior of groups of ToolBars' keys.

All menu commands could be chosen by combinations of keys, the key «Alt» plus keys-accelerators. Keys accelerators are underlined in menu items. If some menu item has been opened, it is necessary to hold the «Alt» key no longer. For instance, it is possible to invoke the dialogue, intended to open a file, pushing the key combination «Alt+F» and the key «O». The most often used menu items show such combinations of accelerators, which commands do not require the menu. For instance: «Ctrl+O» (Open file), «Ctrl+S» (Save file), «Shift+Ins» (Insert block), etc.

3.1.3 Status Bar

The Status Bar is divided into seven sections (see ב), which reflect: the state of AdvancEd, information about long-time processes, types of search and substitution, information about moving from the beginning to the end of some very long file. The menu flag «View>Status Bar» is used to switch on-off the Status Bar.



Pic. 2. The Status Bar

3.2 AdvancEd modes

AdvancEd submits the following modes for flow program documents:

- editing in the full-screen text editor (see ג);
- editing in the editor with the address panel and context graphical help (see ד);
- receiving flow program blocks from the NC system;
- verifying the tool trajectory (see ה).

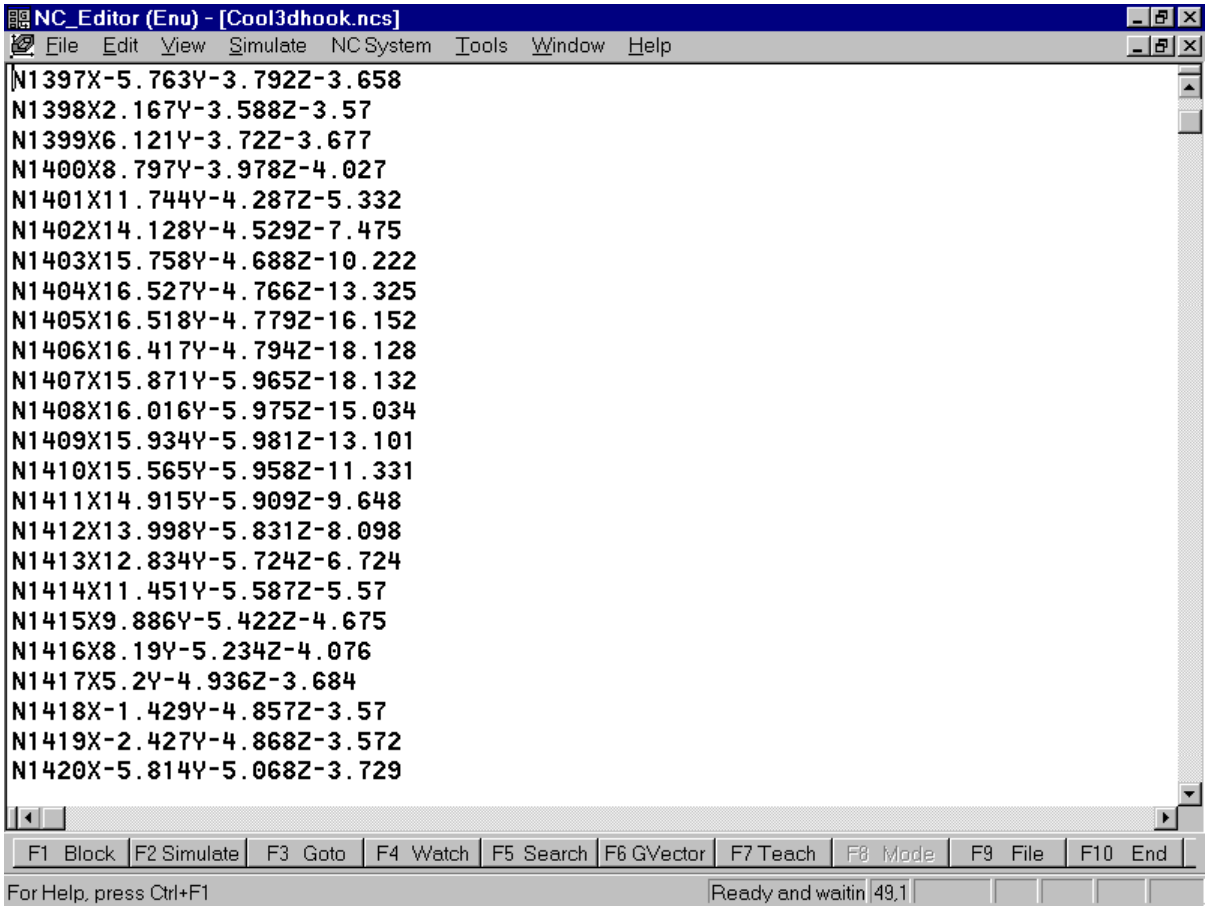
For documents of interpolator data the only full-screen view mode is possible (see ו).

When opening the flow program document, the user is able to switch different edit modes for this document. This switching influences upon the number and arrangement of view windows in the frame of the document (see Windows and documents), and also on the substitution of the context ToolBar (see ToolBars and menu). When opening the flow program document, there is being set either the mode of the full-screen text editor, or the mode of the editor with the address panel. It depends upon, what of this modes was used in the last edit session. Switching from the mode of the full-screen editor to the editor with the address panel is being carried out either by means of setting the menu flag «View>Watch», or from the ToolBar. The transition back is being carried out either by deleting the flag, or from the Toolbar.

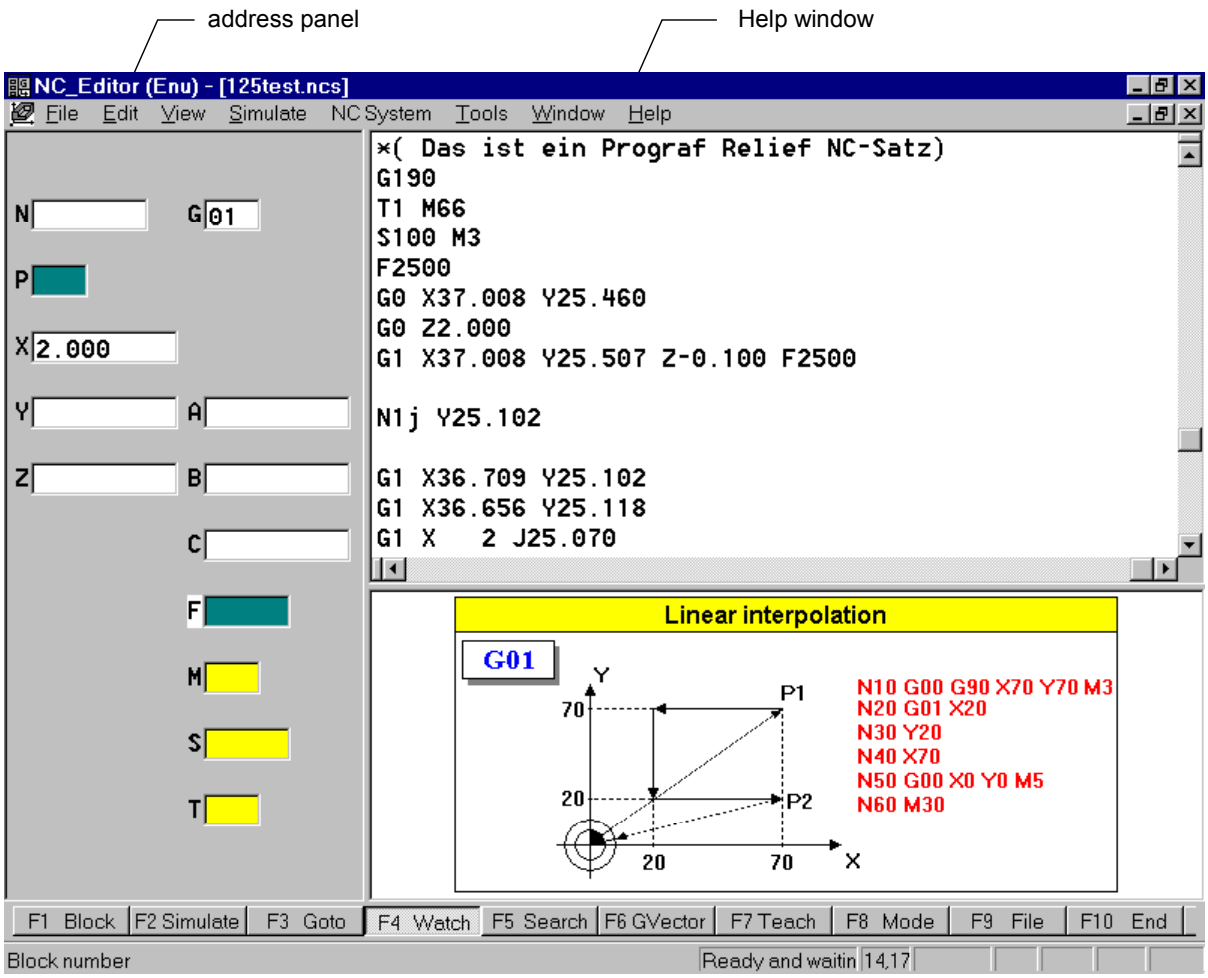
The key F8, or the corresponding ToolBar button, changes the focus between the text editor window and the address panel.

When editing in the mode of the address panel, it is possible to receive the flow program blocks from the NC system. Transition to the teaching mode is made by setting the flag of the menu «NC system>Teaching mode». To switch off, this flag should be deleted. The start and stopping of a teaching mode also is fulfilled by the button on the toolbar or "«F7" key.

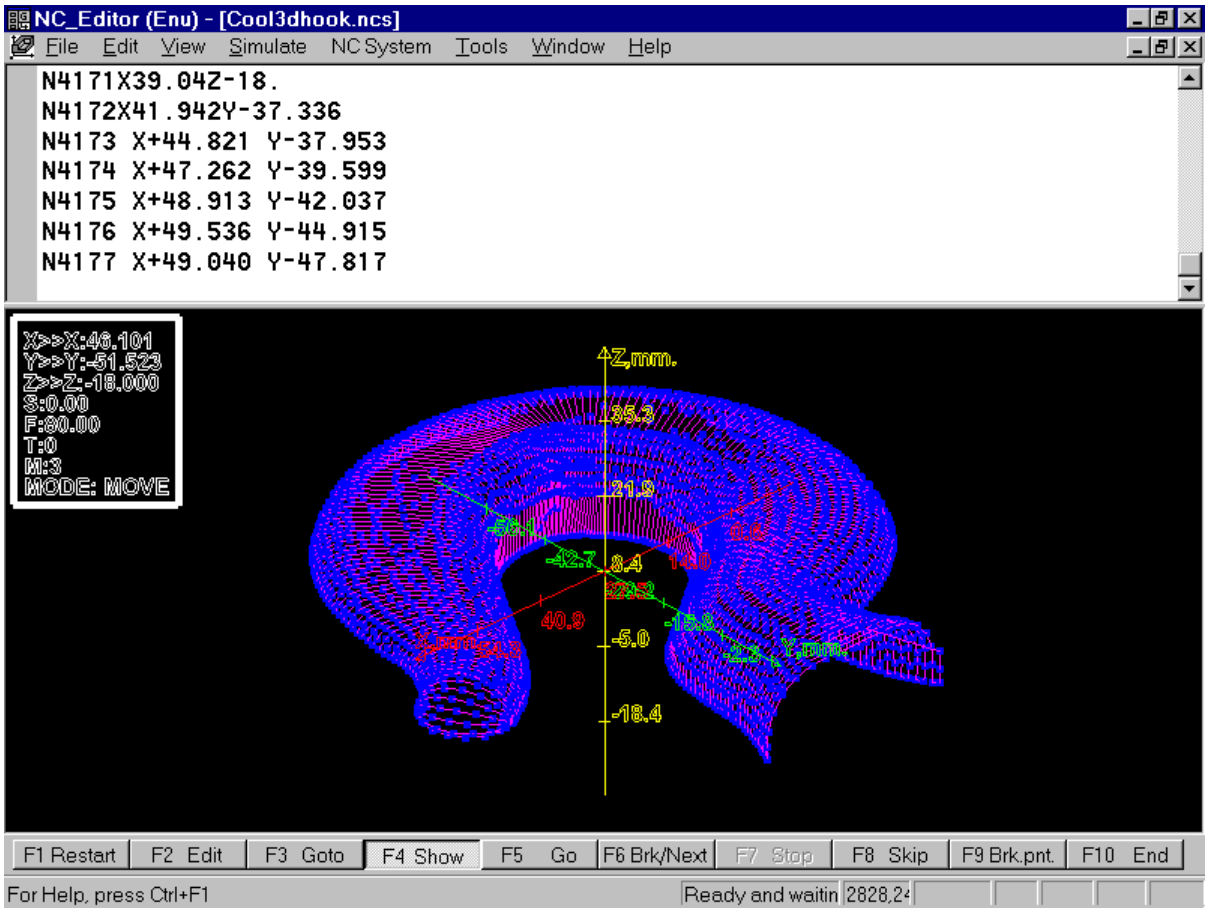
The transition to the tool-trajectory verification mode is possible both from the full-screen edit mode and from the edit mode with the address panel. This transition is initiated either by the menu command «Simulate>Simulate mode», or from the ToolBar. Return back to the edit mode is initiated either by the menu command «Simulate>Edit mode», or from the ToolBar.



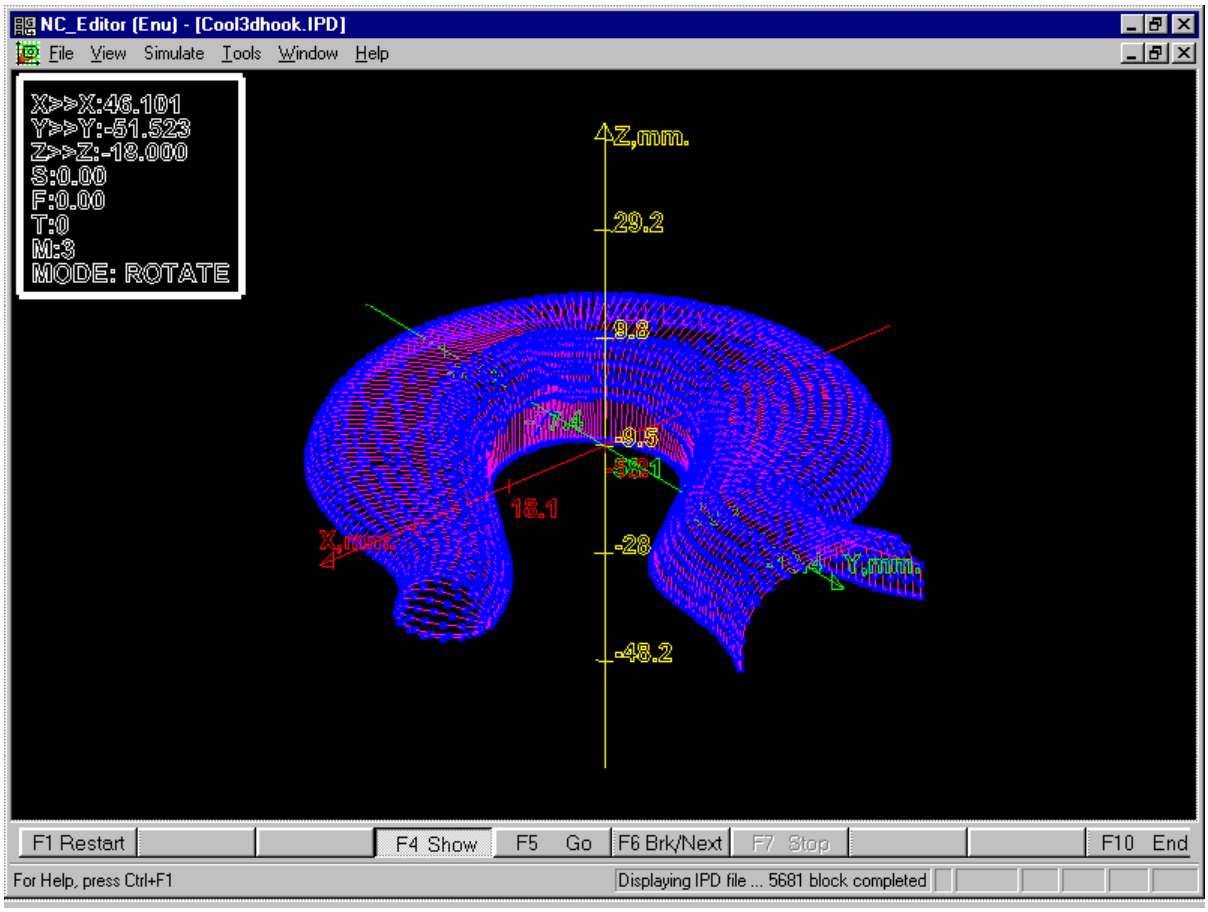
Pic. 3. The full-screen text editor



Pic. 4. The editor with the address panel and context graphical help



Pic. 5. The verification of the tool-trajectory



Pic. 6. Looking through the interpolator data

3.3 Editing and verifying flow programs

3.3.1 Editing flow programs

Flow program blocks could be edited either in the text editor or with the help of the address panel. In any edit mode of AdvancEd the menu command «View>G-vector» could be used to calculate the current G-vector, i.e. the aggregate of active modal G-functions.

3.3.1.1 Text editor

In the window of the text editor there exist possibilities to move along the flow program text, to edit current lines or add new flow program lines. For moving along there are used keys, described in the א.

Table 1. Keys for moving along the text

Key or combination of keys	Cursor movement
arrow «Up»	one line up
arrow «Down»	one line down
arrow «Right»	one symbol right
«Ctrl»+ arrow «Right»	one word right
arrow «Left»	one symbol left
«Ctrl»+ arrow «Left»	one word left
«Home»	to the beginning of the line
«Ctrl»+«Home»	to the beginning of the document
«End»	to the end of the line
«Ctrl»+«End»	to the end of the document
«Page Up»	one page up
«Ctrl»+«Page Up»	to the first line in the page
«Page Down»	one page down
«Ctrl»+«Page Down»	to the last line in the page

For deleting, the text editor needs the following keys, described in the ב.

Table 2. Keys, intended to delete symbols

Key or combination of keys	Action
«Backspace»	deletes the left symbol from the cursor
«Delete»	deletes the right symbol from the cursor
«Ctrl»+«Delete».	Deletes the whole line

The key «Enter» is used to add a new line or to break the line in the cursor position.

Blanks are being added into the current cursor position in the edit window, when pushing the key «Tab». The number of blanks could be set.

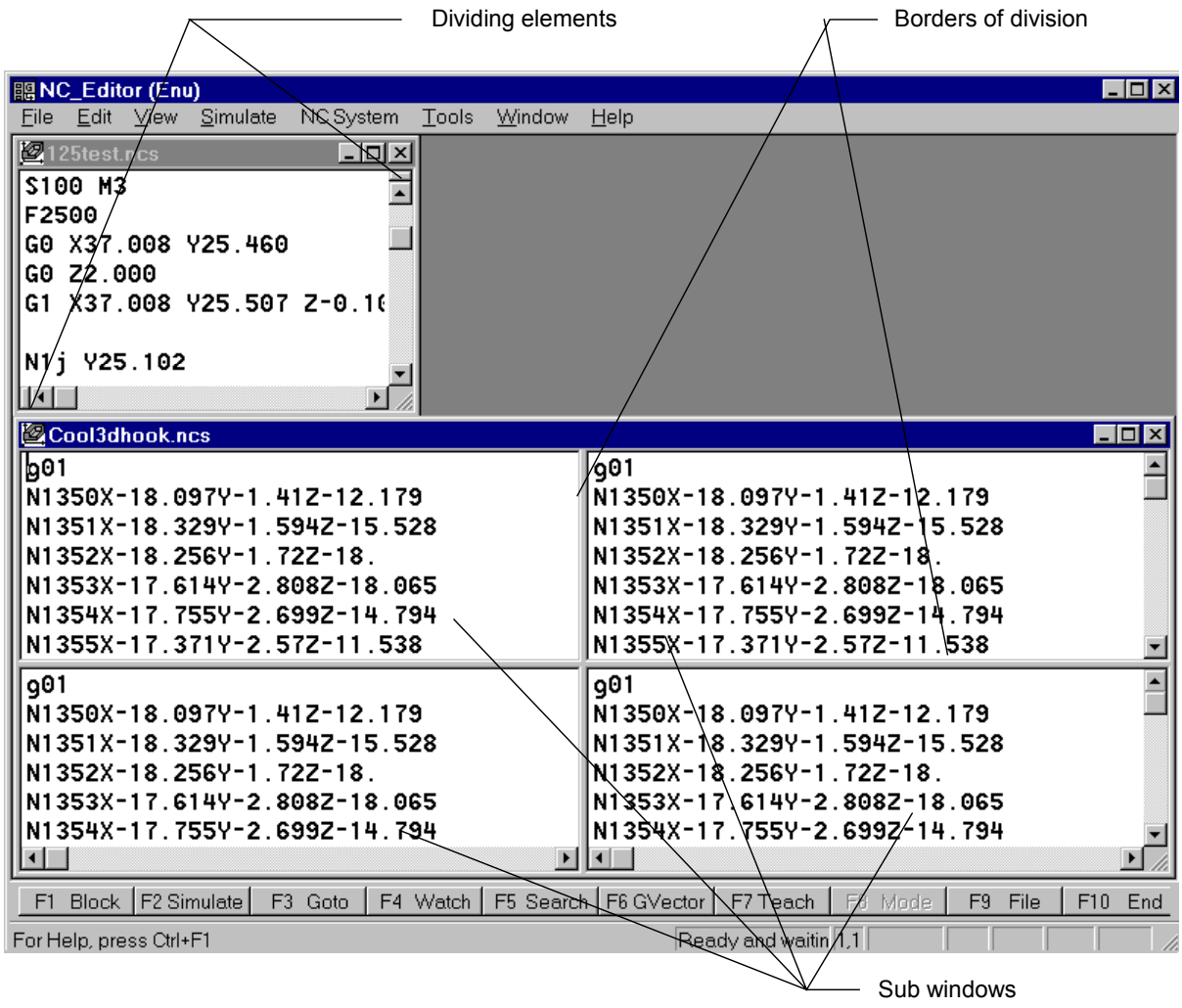
Abnormally carried out operation can be abolished by the menu command « Editing > Undo» or shortcut key «Crtl+Z». The sequential realisation of this command cancels all the earlier carried out operations.

The first possibility to input symbols into the line is to use the insert regime,

when inputted symbols are being added to the current cursor position, shifting those, which exist. The second possibility to input symbols into the line is to use the substitution regime, when the inputted symbols substitute those, which exist. Switching between insert-substitution regimes is being carried out either by means of setting-deleting the menu flag «Edit>Insert». The cursor in the insert regime looks like the thin rectangular; while in the substitution regime it looks like the broad rectangular. The process of switching on the insert regime is reflected in the Status Bar section of insert-substitution (see Status Bar).

The window of text editor could be divided into two or four sub-windows (see r), in case if different parts of the flow program document are to be edited. Changes, included in one of sub-windows, are being duplicated in other sub-windows. Dividing the window could be fulfilled either with the help of dividing elements, or by means of the menu command «Window>Split». To delete dividing, it is necessary to click the mouse twice at the border of dividing.

AdvancEd has the following constraint: the input line should not be longer, than 1024 symbols, including not visible symbols «CR LF». A special warning accompanies an attempt to exceed this constraint.



Pic. 7. Dividing the window of the text editor

When editing in the window of the text editor both in the full-screen mode and in the mode with the address panel (see AdvancEd modes), there appears the context-dependent ToolBar; its keys are shown in the λ.

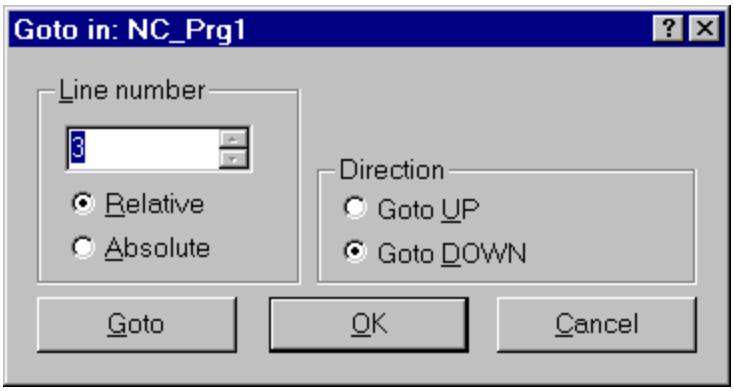
Table 3. Keys of the text editor ToolBar

Key	Purpose
«F1 Block»	Switching on the work with blocks
«F2 Simulate» / «F2 Del»	Transition to the debug mode or deleting the line if the debug mode is not supposed in this application
«F3 Goto»	Invoking the dialogue for transition to a line
«F4 Watch»	Switching between modes, the full-screen editor and the editor with the address panel
«F5 Search»	Invoking the dialogue window for search-substitution
«F6 G_Vector»	Calculating the G-vector for the current block
«F7 Teach»	Starting the teaching mode
«F8 Mode»	Contra-clockwise switching between windows, the text editor, the address panel, the ToolBar. «Shift+F8» - the same, but clockwise.
«F9 File» \ «F9 Abort»	The transition to the mode of working with files; or exiting the program without saving the file, if the parameter -l of the command line has been set
«F10 End»	Exit out of the flow program

The text editor is able to print out the flow program with the help of the menu command «File>Print». See additional information for the Print mode in Printing mode.

3.3.1.1.1 The dialogue window, intended for the transition to a line

The dialogue window, intended for the transition to a line, is used for quick removal to a line with any number (see n). This dialogue window could be invoked either by the accelerator «Ctrl+G», or by the menu command «Edit>Goto line», or by means of the Toolbar.

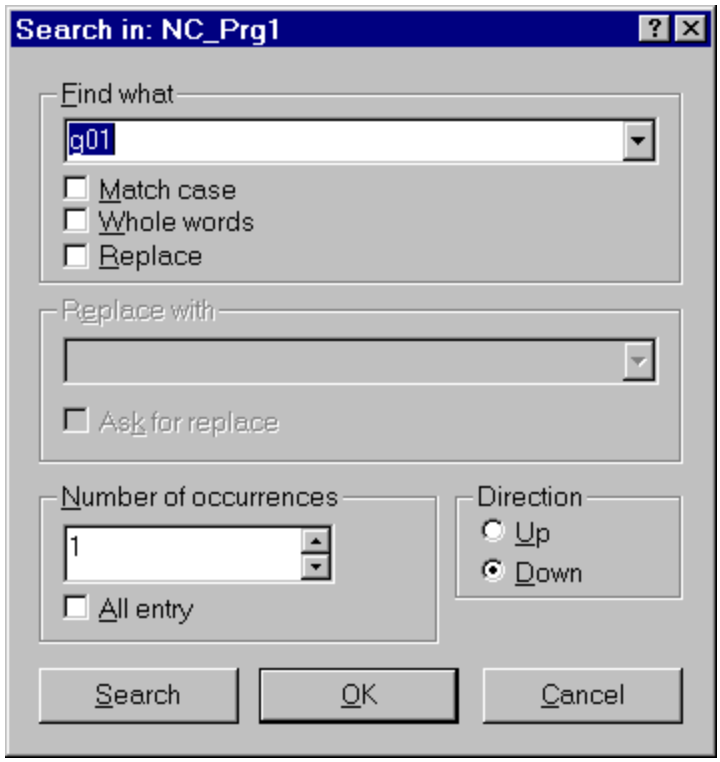


Pic. 8. The dialogue window, intended for the transition to a line

In case the radio-button «Absolute» has chosen the absolute transition, the direction radio-buttons «Goto UP» and «Goto DOWN» become inactive, and the absolute line number should be inputted into the field «Line number». In case the radio-button «Relative» has chosen the relative transition, the direction should be defined by radio-buttons either «Goto UP» or «Goto DOWN», and the number of transition lines should be inputted into the field «Line number». If the transition is initiated by the button «Goto», the dialogue window stays open, and it is possible therefore to realise the relative transition several times in succession.

3.3.1.1.2 The search-replace dialogue window

The search-replace dialogue window is used either for searching or for searching with replacing the given number of the sub-line insertions in the flow program document (see ʊ). This dialogue window could be invoked either by the accelerator «Ctrl+F», or by the menu command «Edit>Search», or by means of the ToolBar.



Pic. 9. The search-replace dialogue window

The sub-line to be found should be inputted into the field «Find what», and the sub-line, replacing one to be found, should be inputted into the field «Replace with» Thirty two sub-lines, used in previous sessions, are being opened in both lists of fields, «Find what» and «Replace with». The flag «Match case» should be set, if it is necessary to take into consideration the register of symbols of the sought sub-line and lines of the flow program document. The flag «Whole words» should be set, if it is necessary to search such insertions of the sought sub-line, which are separated from the rest text by generalized blanks. When the flag «Replace» has been set, the field «Replace with» and the flag «Ask for replace» becomes active. If the flag «Ask for replace» has been set and the sought sub-line is found, there is issued a request for its replacing. When the number of insertions of the sought sub-line becomes equal to the value in the field «Number of contents», the replace operation stops. If the flag «All entry» has been set, the field «Number of occurrences» becomes inactive.

If the button «Search» is used for searching, the dialogue window stays open, and therefore searching could be realised several times in succession.

3.3.1.1.3 Operation with files

There exists a possibility to work with files by means of the menu «File», or with the help of the ToolBar, appearing in the File mode. Purposes of buttons are shown in the.ד The button «F9 File» initiates the transition to this mode.

Table 4 ToolBar keys intended to work with files

Key	Purpose
«F1 New»	Opening an empty window for creation of a new file
«F2 Open»	Opening the file in order to edit it
«F3 Save»	Saving the file with the current name. If the new file has no name yet, then, the standard dialogue for saving a file will be opened.
«F4 Save As»	Saving the file with a new name
«F5 Close»	Closing the current window. If the file in the window has been changed, saving the file will be suggested
«F6 Restore»	Restoring the initial text of the edited file
«F7 »	
«F8 »	
«F9 File»	Exiting the File mode and return to edit mode
«F10 End»	Exit out of the flow program

3.3.1.1.4 Block operations

The text editor AdvancEd is able to fulfil the expanded set of block operations. For this purpose the special ToolBar is being switched on, with keys, described in the ה.

Table 5. ToolBar keys for block operations

Key	Purpose
«F1 Block»	Switching off the work with blocks
«F2 Mark»	Switching on the regime of marking, without the key «Shift»
«F3 Goto»	Invoking the dialogue for transition to the line
«F4 Cut»	Cutting the block
«F5 Copy»	Copying the block
«F6 Paste»	Pasting the block
«F7 Scale»	Scaling axes values in the block
«F8 Renum.»	Re-numerating flow program blocks in the block
«F9 Load»	Invoking the dialogue window, intended to load the block from the file
«F10 Save»	Invoking the dialogue window, intended to save the block in the file

The block could be marked in different ways: in a standard way, moving along the text with holding either the button «Shift» or the left mouse button; in a special marking mode (see «F2 Mark» in ה), which emulates holding the button «Shift». The following operations could be carried out over the marked block:

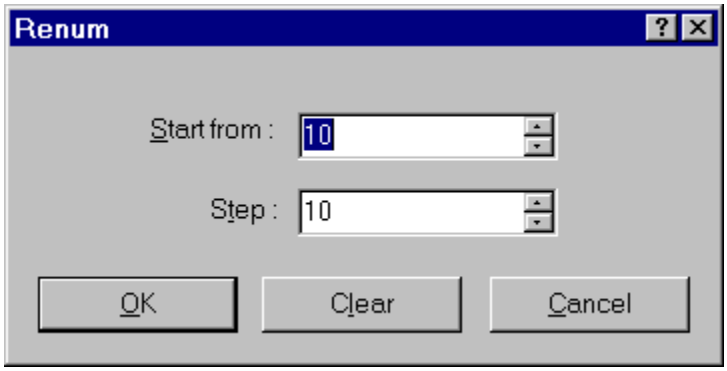
- the menu command «Edit>Cut», cutting into the exchange buffer;
- the menu command «Edit>Copy», copying into the exchange buffer;
- scaling axes values in the block (see The dialogue window of scaling);
- re-numerating flow program blocks in the block (see The dialogue window of re-numerating blocks);
- the menu command «Edit>Save block», saving in the file at the disk.

Besides, the menu commands «Edit>Paste» and «Edit>Load block» make it possible to paste the block, which was copied earlier; and to load the block from the file at the disk. All operations with blocks are available by means of the context menu, being invoked by the right mouse button.

3.3.1.1.4.1 The dialogue window of re-numerating blocks

The dialogue window of re-numerating blocks is used to set, delete and correct numbers of the flow program blocks in the marked block (see י). This dialogue window could be invoked, after marking the block, either by the menu command

«Edit>Renumerate block»; or by means of the ToolBar, intended to work with blocks.

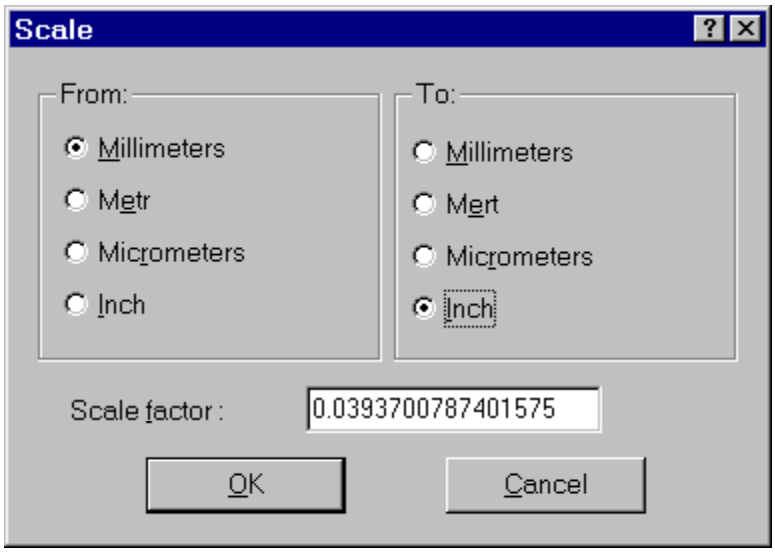


Pic. 10. The dialogue window of re-numerating blocks

The value, starting re-numeration, should be inputted into the field «Start from:». The re-numeration step should be pointed out in the field «Step:» After pushing the key «Clear», all numbers of flow program blocks are being deleted in the marked block.

3.3.1.1.4.2 The dialogue window of scaling

The dialogue window of scaling is used to scale axes values in the marked block. Besides, axes values in the marked block could be automatically re-calculated, when changing measure units (for instance, when substituting inches for millimetres, see אי). This dialogue window could be invoked, after marking the block, either by the menu command «Edit>Scale block», or by means of the ToolBar, intended to work with blocks.



Pic. 11. The dialogue window of scaling

The value of the scale coefficient might be either inputted into the field «Scale factor:»; or calculated automatically, when choosing the corresponding radio-buttons (for different measure units) in groups «From:» and «To:».

3.3.1.2 Printing mode

The printing mode provides the output of the flow program text to the printer or some other printing device. This mode is available only from the window of editing the flow program. This mode has four main divisions.

1.Page setup.

2.Print.

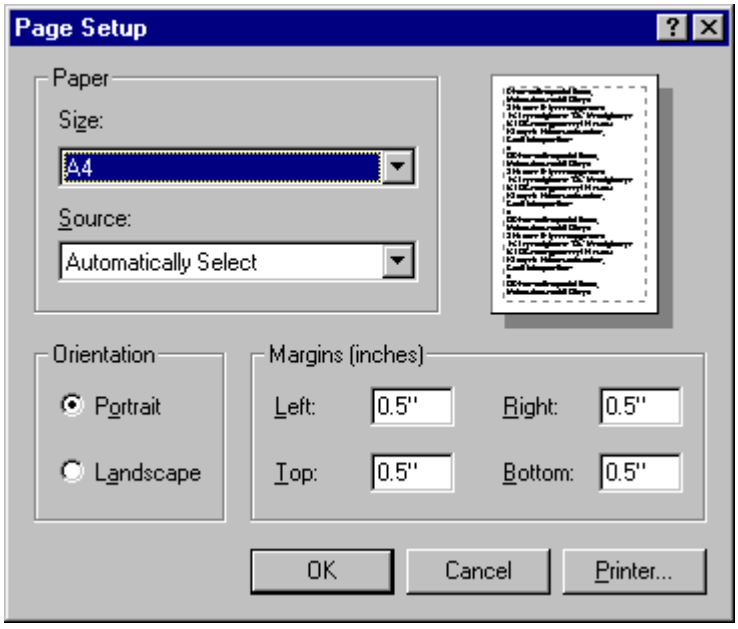
3.Print setup.

4.Print preview.

3.3.1.2.1 Page setup

The page setup dialogue is intended to define parameters of the page, used for printing the document.

The menu «File>Page Setup» is intended to invoke the standard dialogue for setting up page parameters. Dialogue fields Left, Right, Top and Bottom define borders of the printing area accordingly. Setup data will be saved in the initialization file. In all other points, the dialogue behavior is standard.



Pic. 12 The dialogue of setting up page parameters

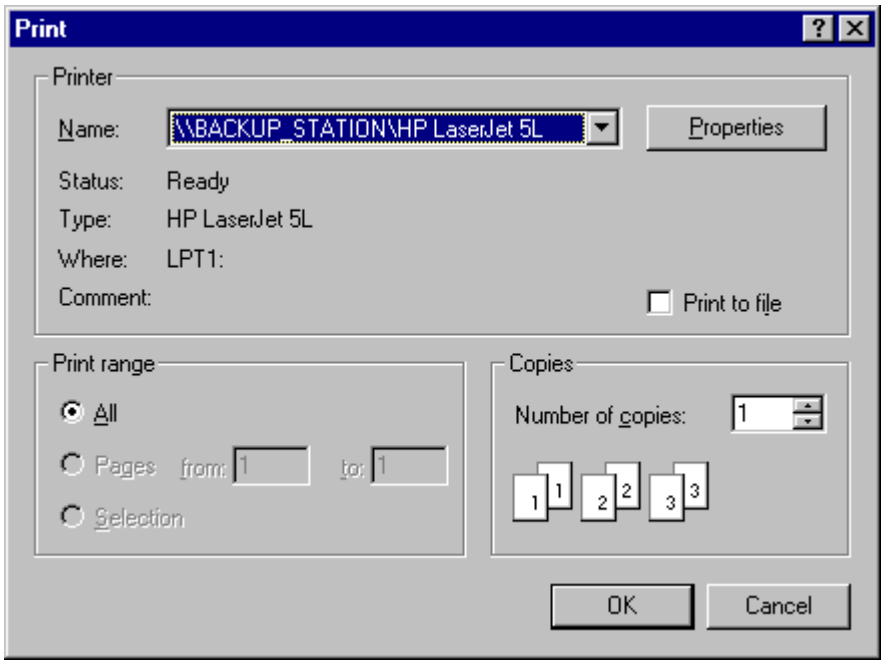
3.3.1.2.2 Print

The print dialogue is intended to choose the type of the printer and to define parameters of printing the document.

For more convenient work with the document, the top running head, containing the page number and the file name, will be printed automatically (see גי).

The peculiarity of the Print mode is the following: when printing file lines, exceeding the print area, the words will be shifted to the next line automatically. If one page is enough for the whole document, the field «Pages» will be deactivated. In all other points, the dialogue behavior is standard.

The standard print dialogue window could be opened from the menu «File>Print» (see גי).

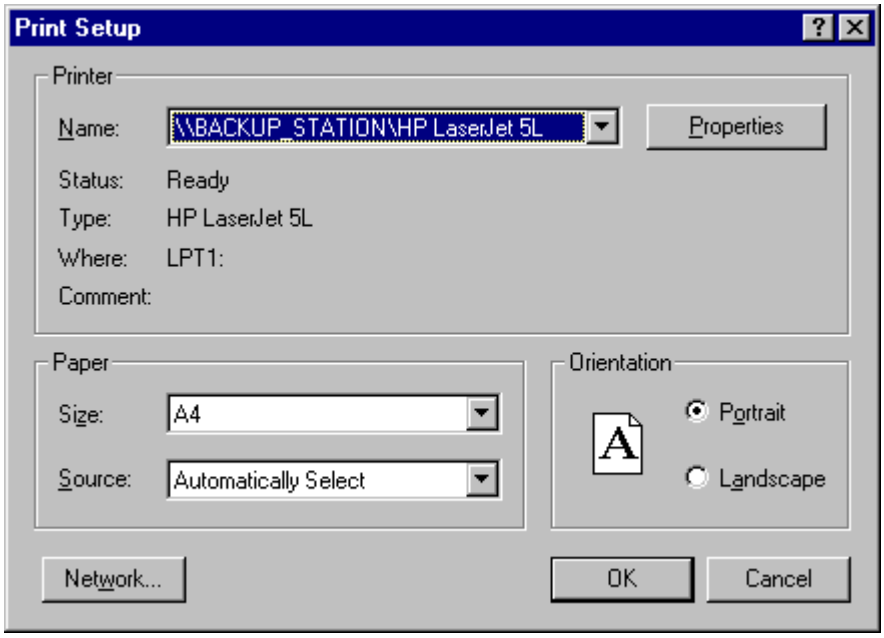


Pic. 13 The print dialogue

3.3.1.2.3 Print setup

The corresponding dialogue is intended to setup print parameters.

The menu «File>Print Setup» is intended to invoke the standard print dialogue (see די). The behavior of the dialogue is standard.



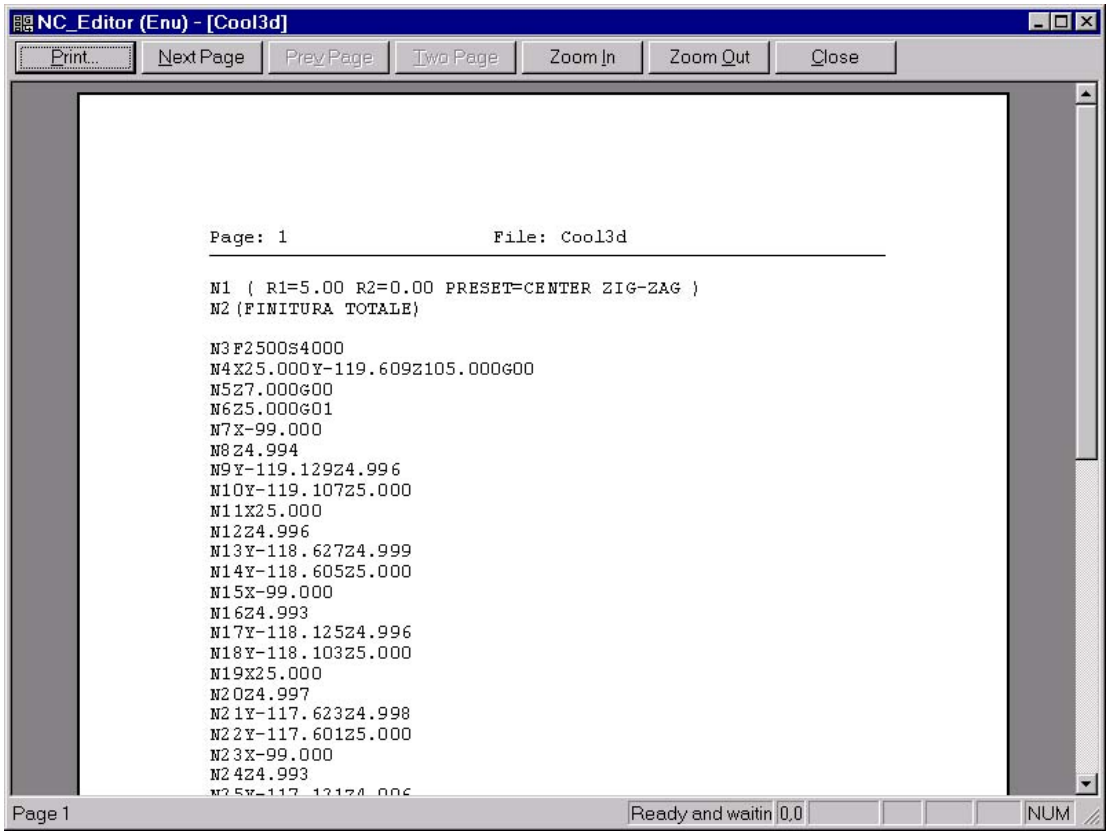
Pic. 14 The print setup dialogue

3.3.1.2.4 Print preview

The print preview mode is intended to preliminary look through the document, which will be printed.

This mode is standard. It is possible to preview one page or two pages, with scaling or without it.

The menu «File>Print Preview» is used to invoke the preview mode (see υι). The behavior of the mode is standard.



Pic. 15 The preview mode.

3.3.1.3 The address panel

The address panel is especially necessary, when editing flow programs by means of the special operator panel (for instance, NC system operator panel). The reason is, that normally, the operator panel has a restricted set alphabetical keys, and this inconveniences the work with some usual text editor. The address panel together with the context graphical help make it possible to realise syntactical and partly semantic checking of inputted blocks. When working with the address panel, the line of the current edited block in the text editor is lightened; and the corresponding ToolBar appears, with key purposes, described in the ı. Keys «Tab», «Up» and «Down» execute displacement between input fields of the address panel. In the process of displacements, in the StatusBar message section (see Status Bar), there are outputted prompts about the purpose of the address current input field. A new block is inputted in the insert regime, when pushing the key «Enter» of the address panel. The transition to a next block takes place in the replace regime, when pushing the key «Enter» of the address panel. The layout of fields in the address panel should be defined in the configuration file, setting up AdvancEd for some

concrete version of the ISO-7bit language (see Structure of G-function parameters).

The size of the address panel could be changed by removing its right border. This size could be set automatically either by means of the menu command «View>Resize>Resize address», or by means of the double mouse click in the address panel area, which is not occupied by windows of input fields.

Table 6. Toolbar keys for the address panel

Key	Purpose
«F1 Add»	Adding an empty line in the current position
«F2 Del»	Deleting the current line
«F3 Up»	Shifting up the lightened line, the step is one line
«F4 Down»	Shifting down the lightened line, the step is one line
«F5 <<»	Shifting one step left the current co-ordinate of the G-vector
«F6 >>»	Shifting one step right the current co-ordinate of the G-vector
«F7 Teach»	Starting the teaching mode
«F8 Mode»	Contra clockwise switching between windows of the text editor, the address panel and the ToolBar; «Shift+F8» - clockwise switching
«F9 File» \ «F9 Abort»	The transition to the mode of working with files; or exiting the program without saving the file, if the parameter -I of the command line has been set
«F10 Exit»	Exiting the program

3.3.1.4 The window of the context graphical help

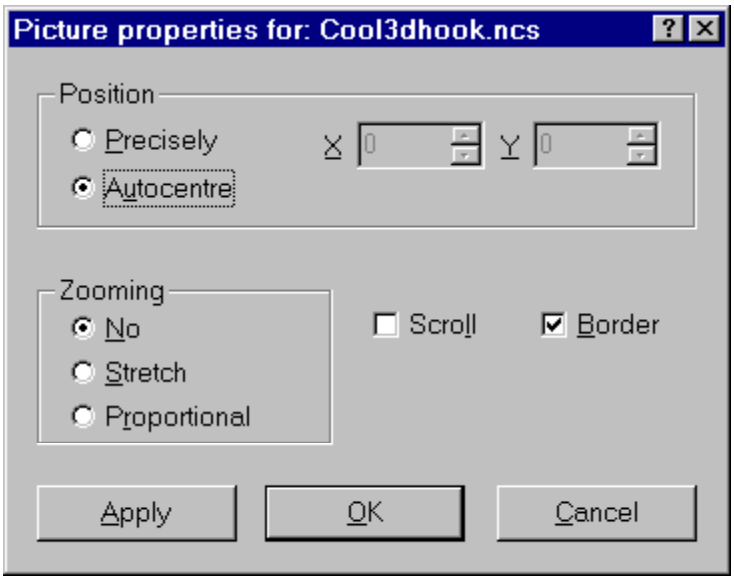
The graphical file with reference information is displayed in the window of the context graphical help. This information is especially important, when programming sophisticated G-functions; such as standard cycles G81-G89, specific for every type of the machine-tool. The name of the graphical file is pointed out in the configuration file, setting up AdvancEd for the concrete version of the ISO-7bit language (see Structure of the G-function's header). The way of displaying the graphical file in the window of the context graphical help could be set up (see The dialogue window, intended to set up properties of the window of the context graphical help).

The size of the window of the context graphical help could be changed by removing its top border. This size could be set automatically either by the menu

command «View>Resize>Resize image», or by means of the double mouse click in the window area.

3.3.1.4.1 The dialogue window, intended to set up properties of the window of the context graphical help

This dialogue window is used to define the way of displaying graphical file in the window of the context graphical help (see ʊr). The dialogue window could be invoked either by the menu command «View>Picture properties», or by the pop-up menu by clicking the right mouse button.



Pic. 16. The dialogue window, intended to set up properties of the window of the context graphical help

The radio-button «Autocentre» serves to centre the view in current sizes of the window of the context graphical help. The radio-button «Precisely» serves to define co-ordinates of the top left angle of the view in the fields «X» and «Y». The scaling radio-buttons («No», «Stretch», «Proportional») define the corresponding view scaling in the window of the context graphical help. The flag «Scroll» permits displaying of scrolling lines; the flag «Border» - permits displaying borders around the view.

3.3.2 Verification of the tool trajectory

Verification is possible after creating and modifying some flow program in AdvancEd (see AdvancEd modes). The corresponding ToolBar appears in the

verification mode; and its keys are described in the ד.

Table 7. ToolBar keys in the verification mode

Key	Purpose
«F1 Restart»	Restarting verification from the beginning of the flow program
«F2 Edit»	Returning to the edit mode
«F3 Goto»	Invoking the dialogue, supporting the transition to a line
«F4 Show»	Switching on-off the view of the tool trajectory
«F5 Start»	Starting the continuos verification process
«F6 Brk/Next»	The transition to the mode of step-by-step verification / The next block in the mode of step-by-step verification
«F7 Stop»	Stopping the verification process
«F8 Skip»	Skipping blocks in the verification process
«F9 Brk.pnt.»	Setting breakpoints
«F10 End»	exiting the program

The trajectory, obtained in the verification process, is being displayed in the window of the tool trajectory (see The window of the tool trajectory).

In the process of verification the flow program looks like the high level one with corresponding debugging abilities. The process of verification might be either continuos, or step-by-step. The menu command «Simulate>Start» starts the continuos verification process. the menu command «Simulate>Restart» restarts the verification process from the very beginning. The menu command «Simulate>Next/Break» starts the step-by-step verification process, realises the transition from the continuos process into step-by-step one, verifies the next block in the step-by-step process. The menu flag «Simulate>Show» makes it possible to switch on-off the tool trajectory view in order to look through concrete parts of the tool trajectory.

The menu flag «Simulate>Incert breakpoint» sets the breakpoint to any flow program block in the verification mode (see ו). When the breakpoint is reached the verification process halts and could be restarted either step-by-step, or continuously. Inasmuch as the ISO-7bit language is interpretative one, it is possible to edit flow program blocks after halting the verification process.

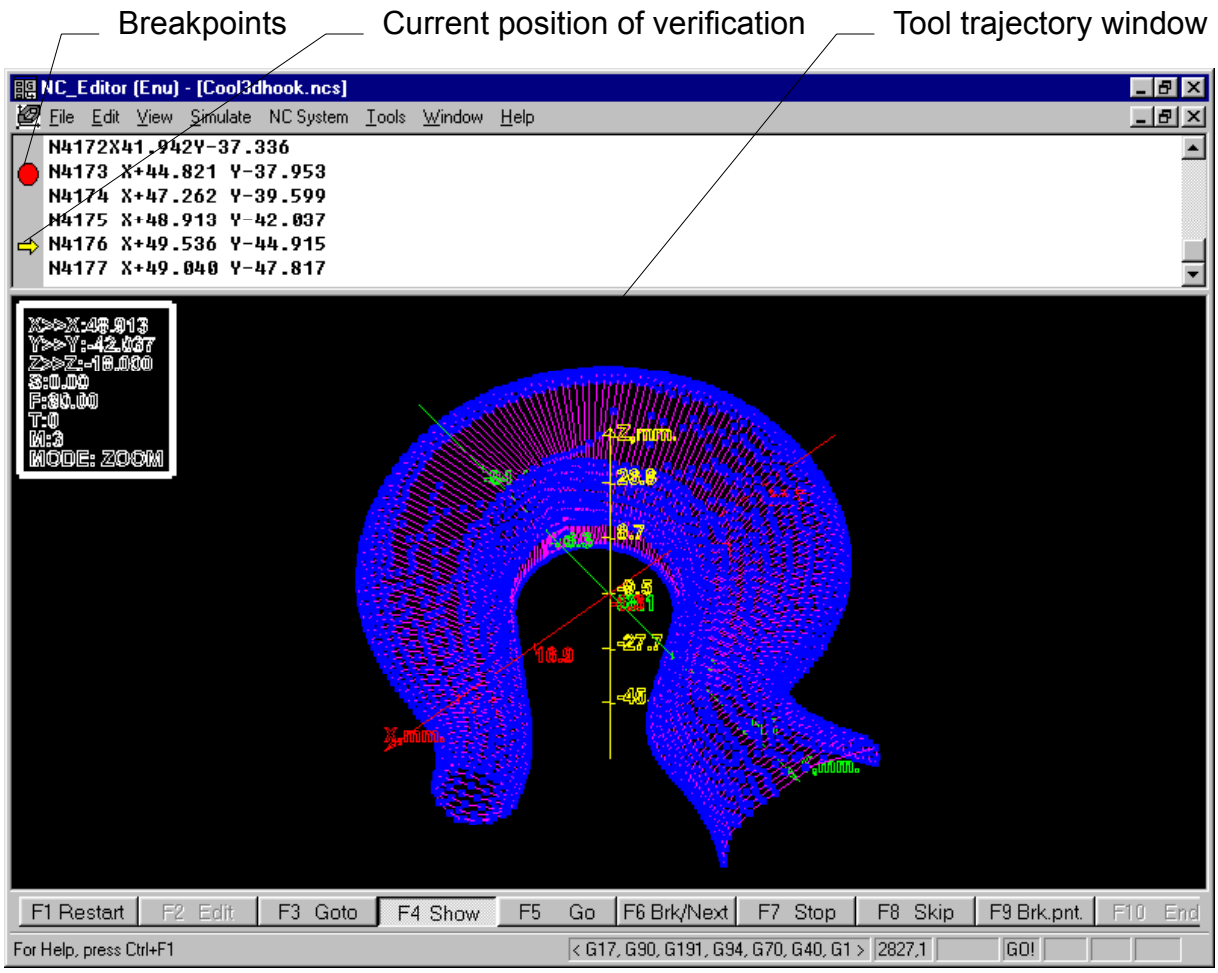
The menu flag «Simulate>Skip» in the continuos verification process switches

on skipping blocks and the rapid transition to the nearest breakpoint, or to the end of the flow program, if such a breakpoint is absent. If skipping is switched on in the step-by step verification process, flow program blocks are not being verified; and this makes it possible to verify any parts of the flow program.

The menu command «Simulate>Stop» is used to stop the verification process.

In the verification mode there exist additional possibilities: to set up delay between verification of neighbour blocks; to create the file of interpolation data (see The dialogue window of setups).

In the verification process the G-vector is being calculated for every block, and the result is being presented StatusBar message section (see the Status Bar).



Pic. 17. Debugging of the flow program

3.3.2.1 The window of the tool trajectory

Results of the verification process are being displayed in the window of the

tool trajectory (see ו). The view is 3D, it could be scaled, rotated and moved, using either the mouse or the keyboard.

There are several regimes to work with the view of the tool trajectory.

Switching between management regimes is being carried out either by clicking the right mouse button, or by using the combination «Alt» + «M».

To manage the view, shift the mouse, holding the left button; or use buttons, controlling the cursor with the keyboard together with buttons «Alt» and «Ctrl» (see n).

When the regime MOVE is active, there is being displaced the view in the screen plane, independently of the coordinate axes position. When the button «Ctrl» has been pushed, the displacement goes on orthogonal to the screen plane; the view of the trajectory does not change, at that; but the axes units are being recalculated.

When the regime ROTATE is active, the view is being rotated. Either when moving the view in the vertical direction, or when using buttons «Alt»+»Up» or «Alt»+»Down», the view is being rotated in the vertical plane, orthogonal to the screen plane. When the button «Ctrl» is pushed, the view is being rotated in the screen plane. When either moving the mouse in the horizontal direction, or using buttons «Alt»+»Left» и «Alt»+»Right», - the view is being rotated around the axis Z. In all cases rotation takes place together with the coordinate system.

In the ZOOM regime the view is being scaled. The view is being increased, when the mouse goes down or the buttons «Alt»+»Down» are being pushed. Decreasing is being carried out, when the mouse goes up or the buttons «Alt»+»Up» are being pushed.

When the mouse is in the point of the tool trajectory in the edit window, the corresponding block of the flow program is being selected in the edit window. Parameters or the flow program block are being displayed in the information window. The information window is able to show the number, values of addresses selected block of the flow program, and the current regime of the flow program and the current regime of managing the view, depending upon the setups in the dialogue window (see the dialogue window, intended to setup parameters of the tool trajectory window).

When the INFO regime is active, there is being carried out the displacement of the information window in the limits of the window, showing the tool trajectory. The displacement could be realized either by means of the mouse, holding the left button

of it at the border of the window; or by means of buttons, controlling the cursor, when the «Alt» button has been pushed.

Table 8. Keys, controlling the view in the verification regime

Key combination	Action
	MOVE regime
«Alt» + «Up»	Moving the view up in the screen plane
«Alt» + «Down»	Moving the view down in the screen plane
«Alt» + «Left»	Moving the view left in the screen plane
«Alt» + «Right»	Moving the view right in the screen plane
«Ctrl» + «Alt» + «Up»	Deleting the view
«Ctrl» + «Alt» + «Down»	Bringing the view near
	ROTATE regime
«Alt» + «Up», «Alt» + «Down»	Rotating in the vertical plane orthogonal to the screen plane
«Alt» + «Right»	Clockwise rotating round the Z axis
«Alt» + «Left»	Counter-clockwise rotating round the Z axis
«Ctrl» + «Alt» + «Up», «Ctrl» + «Alt» + «Down»	Rotating in the screen plane
	ZOOM regime
«Alt» + «Up»	Decreasing the view
«Alt» + «Down»	Increasing the view
	INFO regime
«Alt» + «Up»	Moving the information window up
«Alt» + «Down»	Moving the information window down
«Alt» + «Left»	Moving the information window left
«Alt» + «Right»	Moving the information window right

Fixed positions of coordinate axes are being invoked by the combination of the button «Ctrl» and buttons «1» - «5». (see υ).

Table 9. Fixed positions of coordinate axes

Combination of buttons	Positions of coordinate axes
«Ctrl» + «1»	Isometric - 1
«Ctrl» + «2»	Plane YZ
«Ctrl» + «3»	Plane XZ
«Ctrl» + «4»	Plane XY
«Ctrl» + «5»	Isometric - 2

The window of the tool trajectory has large possibilities to setup view parameters (see the dialogue window, intended to setup parameters of the tool trajectory window):

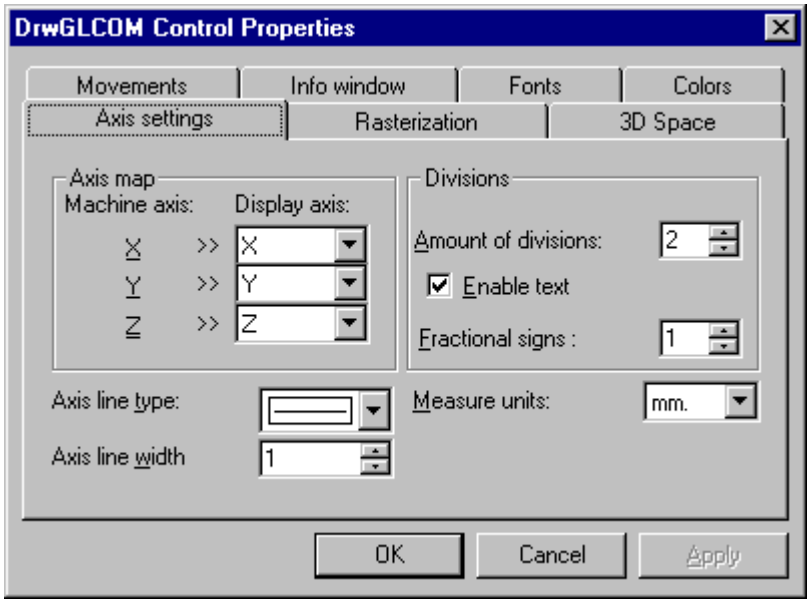
- measurement units and properties of displayed axes;
- visualization quality;
- position in the 3D space;
- line styles and types for the work and rapid movements;
- contents of the information window;
- text and line colors;
- text fonts.

3.3.2.1.1 The dialogue window, intended to set up parameters of the window of the tool trajectory

The dialogue window, intended to setup parameters of the tool trajectory window, is used to define the way of displaying the trajectory. This dialogue window could be invoked either by the menu command «View>Emulate Options » or by the double mouse click in the tool trajectory window. In the process of work with the dialogue window in the tool trajectory window there is being shown the test example with current setups. The dialogue window includes seven Tabs, grouping setup parameters. .

The sheet «Axis settings» makes it possible both to choose positions of axes for their displaying and to setup their properties (see ıп).

In fields of the group «Axis мар» there are being shown correspondences of axes, displayed at the screen and those, defined in the flow program.



Pic. 18. The sheet «Axis settings»

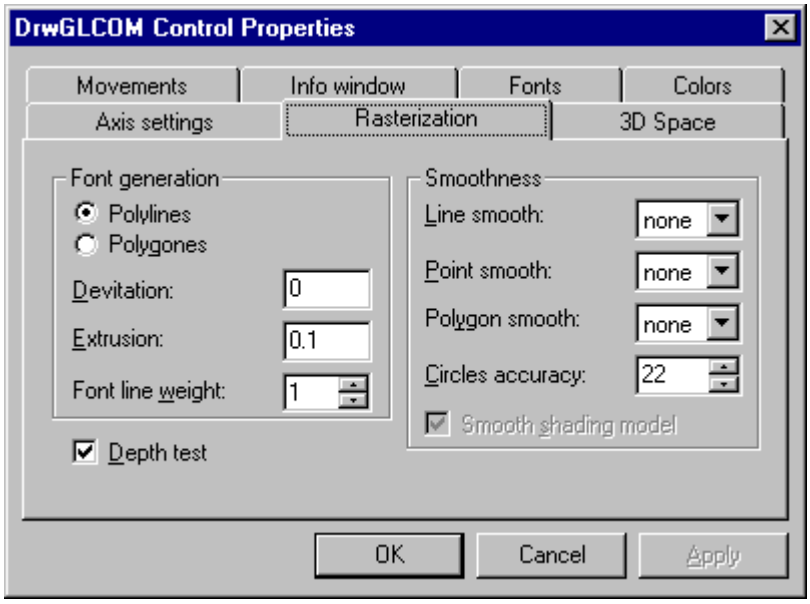
In the group «Divisions» there are being setup parameters of axes divisions. The whole quantity of divisions is being defined in the field «Amount of divisions» It should be said, that a lot of divisions makes the tool trajectory window less observable.

The flag «Enable text» defines the necessity of some values under axes divisions; and the field «Fractional signs» points out the precision of the value. Values of divisions are being calculated automatically.

Fields «Axis line type» and «Axis line width» define the type and the width of axes accordingly.

The list «Measure units» makes it possible to choose the measurement units, millimeters or inches.

The sheet «Rasterization» sets the view quality (see ט).



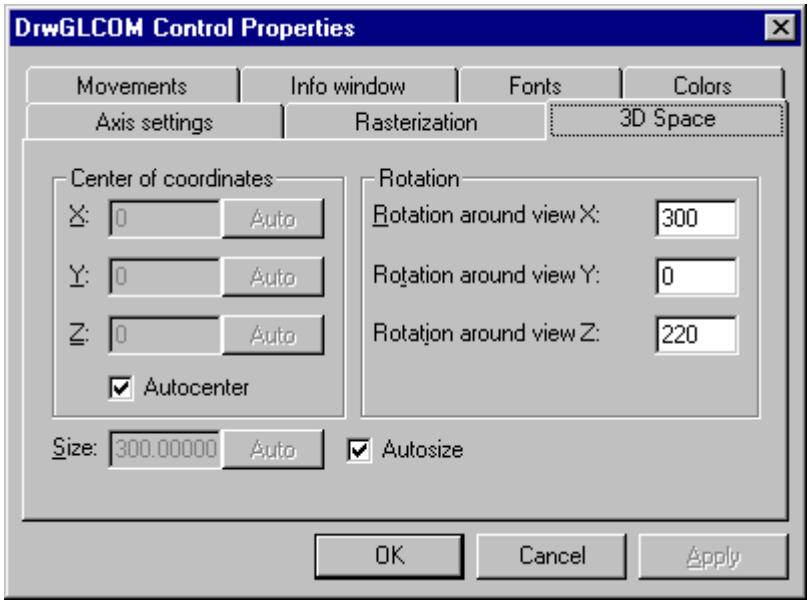
Pic. 19. The sheet «Rasterization»

The group «Font generation» defines the text parameters. Radio-buttons makes it possible to choose the way of displaying the text: «Polylines» , by means of broken lines; «Polygons», by means of polygons.

Lists in the group «Smoothness» set the way of smoothing lines (Line smooth), smoothing points (Point smooth) and smoothing polygons (Polygon smooth). The field «Circle accuracy» defines the precision of displaying circles.

The flag «Depth test» switches on checking of mutual covering objects.

The sheet «3D Space» makes it possible to define the position of objects in the space (see ɔ).



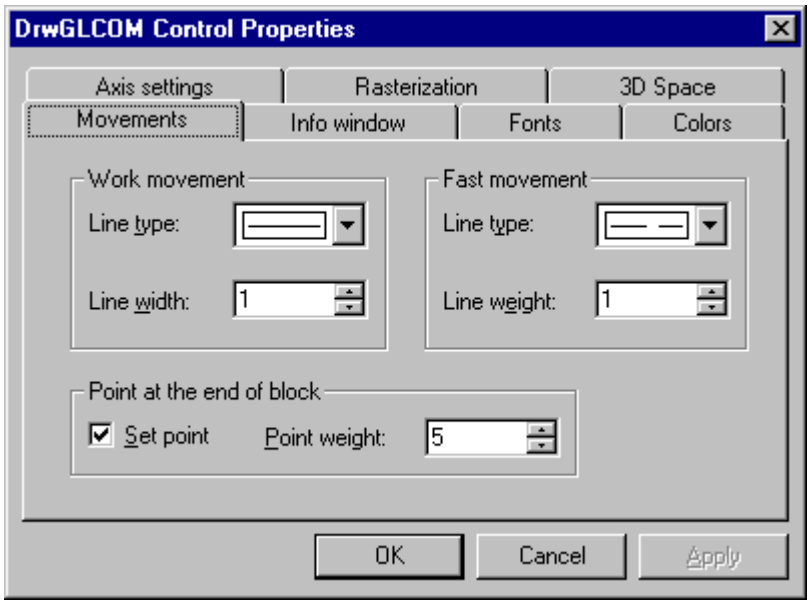
Pic. 20. The sheet "3D Space"

The initial coordinates are being defined in the group «Center of coordinates». The button «Auto» sets these values automatically for every axis, depending upon the size of the visualized object. The flag «Autocenter» initiates calculation and changing coordinates in the process of verification.

The group «Rotation» defines angles of rotation of the view (in grades) around coordinate axes.

The field «Size» sets the scale of the view. The flag «Autosize» and the button «Auto» automatically change sizes of the view depending upon the visible area of the tool trajectory window.

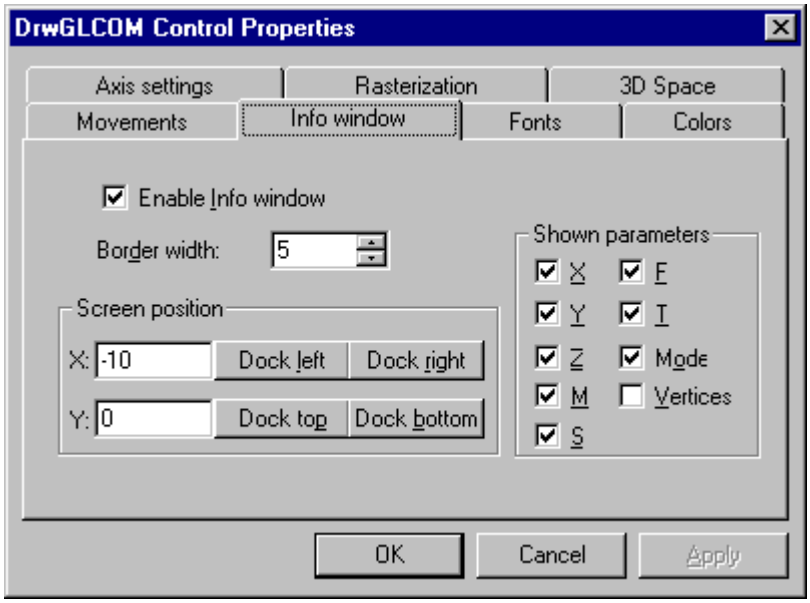
The sheet «Movements» serves to choose the width and type of lines, showing work and rapid movements (see אכ).



Pic. 21. The sheet «Movements»

From the list «Line type» of the group «Work movement» there is being chosen the type of the line for the work trajectory movement; while in the group «Fast movement» there is being chosen the type of the line for the rapid trajectory movement. «Line width» define widths of corresponding lines. When the flag «Set point« in the group «Point at the end of block» is set, points on the trajectory show borders of blocks. The field «Point width» defines the size of points.

The sheet «Info window» sets up the contents of the information window (see בכ).



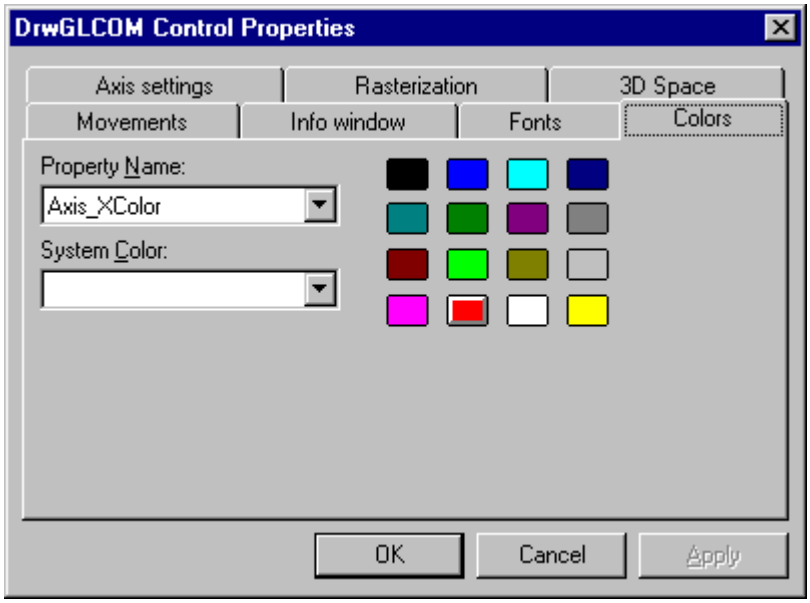
Pic. 22. The sheet "Info window"

The flag «Enable info window» switches on the information window. The field «Border width» defines the width of the border.

In the group «Screen position» there is being defined the position of the information window. The set of buttons makes it possible to pin the window across the edge of the visible area of the tool trajectory window.

The set of parameters, which are present in the information window, is defined by corresponding flags of the group «Shown parameters» .

The sheet «Colors» makes it possible to choose the color of any element of the tool trajectory window (see גכ).



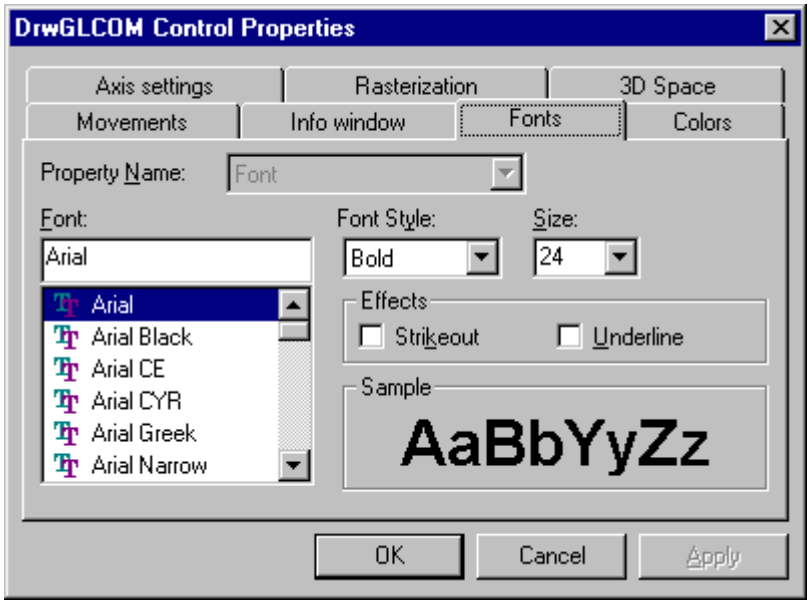
Pic. 23. The sheet «Colors»

In the list «Property» there should be chose the element of the tool trajectory window, for which the color is to be nominated. Such elements could be:

- BackgroundColor, the background color of the window;
- PointColor, the color of points at the ends of flow program blocks;
- WorkMoveColor, the color of the work trajectory movement;
- FastMoveColor, the color of the rapid trajectory movement;
- RulerColor, the color of the ruler;
- GridColor, the color of the grid.

The color might be set either from the color pallet, or like the color of some system element, which is being chosen from the list «System color».

In the sheet «Fonts» there could be chosen the type and the way of drawing of fonts, intended for signatures under divisions of axes (see דכ).



Pic. 24. The sheet «Fonts»

3.3.3 Teaching mode

One of possibilities to create the flow program by means of AdvancEd is to use the Teaching mode. The idea is to accept data in the address panel directly from the NC system in order to quickly create some flow program block.

3.3.3.1 Setup

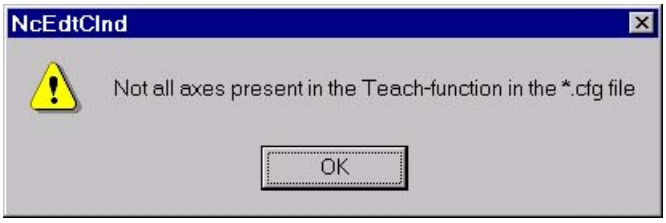
The setup of AdvancEd should be made before applying the teaching mode. The setup consists of three steps.

1. It is necessary to define the TEACH command and its parameters in the configuration file.
2. It is necessary to identify NC system axes (it will be done automatically).
3. It is necessary to identify active axes, used to create the flow program block.

To use the Teach mode, some changes must be made in the configuration file (in case, if the TEACH command has not been defined).

The definition of the TEACH command looks the same as the definition of some usual G-command. But it is necessary to take into consideration, that the name of the TEACH command should be strictly defined as TEACH01. This command must belong to the first group, and parameters' names must strictly

correspond to names of NC system axes. If the name of the command is incorrect, the Teach mode is unavailable. If parameters' names are incorrect, the Teach mode is also unavailable; and the corresponding message will appear (see הכ).



Pic. 25 The message about incorrect definition of TEACH-command parameters

At the second step there takes place polling of the NC system and its axes. This step is carried out automatically.

Activation of axes corresponds to the user wish. During the setup dialogue, it is possible to choose parameters, which values will be used in the flow program block. By default, all parameters of the NC system are active.

3.3.3.2 Activation and work

Activation of the Teach mode could be done both from the menu «NC System>Teaching mode» and from the toolbar by button «F7 Tecah», and by means of the hot key Ctrl+T or F7.

When activating the Teach mode, there appears the setup dialogue window (see וכ), which contains the full set of axes names of the NC system. If errors of axes definition in the configuration file are absent, - all dialogue fields are available and all axes are active by default. The symptom of axes activity is a mark in the Check box control element, this mark corresponds to the name of the axis, at that.

Work in the Teach mode can be supported by the ToolBar.

Table 10 Toolbar keys for the teaching mode

Key	Purpose
«F1 Abs. Zero»	Outputting values in the absolute coordinate system
«F2 Mach Zero»	Outputting values in the machinetool coordinate system
«F3 Rel Zero»	Outputting values in the relative coordinate system
«F4 mm» / «F4 Inch»	Choosing measurement units for outputted values
«F5 Axes Sel»	Opening the dialogue window for choosing axes
«F6 G-Vector»	Calculating G-Vector
«F7 Stop»	Stopping the Teaching mode
«F8 ASCII»	
«F9 Accept»	Inputting values into the flow program text. The same as Enter
«F10 Выход»	Exiting the program

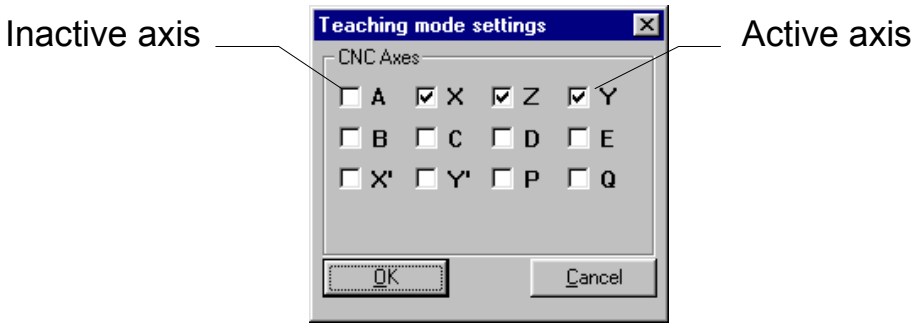
The flow program block is created by means of the clicking «Enter» in the address panel. The created block is added to others, and it is displayed in the active cursor position in the Edit window.

Change of the command name, used in the created flow program block, might be done from the address panel. The choice of available names is restricted by the set of functions, which belong to the first group.

Changing setups of the mode (choosing active axes) takes place with the help of the dialogue, setting up the Teach mode (see וכ). This dialogue is invoked from the pop up menu, when clicking the right mouse button or pushing the button «F5 Axes Sel». The mode is delayed, at that, until new setups are defined. After clicking «OK» or «Cancel» the mode proceeds. Values of activated axes are inputted into the address panel.

The exit out of the mode could be made either with the help of the menu «NC System>Teaching mode», or by means of the hot key Ctrl+T of the address panel, or by toolbar button «F7 Stop».

3.3.3.3 Setup dialogue of the Teaching mode



Pic. 26 The setup dialogue of the teaching mode

The setup dialogue of the Teaching mode provides the definition of user setups of the Teaching mode and informs the user about setup problems, which might appear.

The dialogue displays axes names of the NC system. Active axes names are marked. Deactivated axes notify about an error in the configuration file.

When clicking the button «OK» all user setups will be saved. In case, if the button «Cancel» is clicked, all current user setups will not be saved; but there will be applied those, defined earlier.

3.4 Viewing files with interpolator data

To view the contents of files with interpolator data, there is used the similar window of the tool trajectory, like in the verification mode (see Verification of the tool trajectory). In the view mode (see AdvancEd modes), there appears the corresponding ToolBar with keys, described in the אי.

Table 11. Keys of the mode, intended to view files with interpolator data

Key	Purpose
«F1 Restart»	Restarting the view from the beginning of the file with interpolator data
«F4 Show»	Switching on-off the view of the tool trajectory
«F5 Go»	Starting the continuos view process
«F6 Brk/Next»	Switching to the step-by-step view / The next block is in the step-by-step view mode
«F7 Stop»	Stopping the view process
«F10 End»	Exiting the program

The view process, like the process of verification, could be either continuos, or step-by step one. The menu command «Simulate>Start show IPD file» starts the continuos view process; the menu command «Simulate>Restart» realises restart from the beginning of the file. The menu command «Simulate>Next/Break» starts the step-by-step, initiates the transition from the continuos process into step-by-step one, realises the view of the next block in the step-by-step process. Just like in the verification process, in the interpolator-data-file view process, there is invoked the dialogue window, intended to set up parameters of the window of the tool trajectory. The dialogue window could be invoked either by the menu command «View>Emulate options», or by means of clicking the right mouse button in the window of the tool trajectory.

3.5 Starting external applications

AdvancEd allows the user to define up to sixteen external applications, which could be started from the menu «Tools». The first and the last points of this menu («Tools>Cfg Editor» and «Tools>Customise») are rigid; they are used both to invoke the editor of configuration files and to set up the menu. The points, which are being added by the user, these points are located between the first and the last points and might have any names.

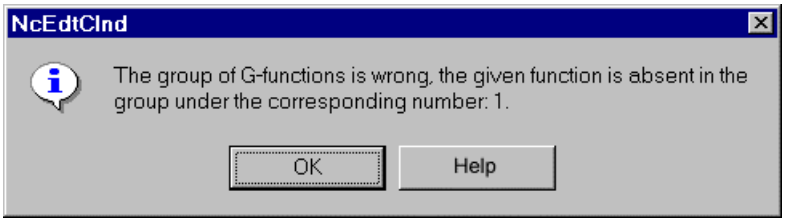
3.6 Getting reference information

AdvancEd suggests two kinds of help; the first is reference one, the second is context one.

The reference help presents itself to be the electronic version of this very reference manual. The contents of the reference help could be invoked by the menu command «Help>Help Topics». The chapter of the reference help, describing the main abilities of AdvancEd, could be invoked by the menu command «Help>Help Index». The menu command «Help>Help Using» invokes the description of the reference-help sub-system, as well as methods of getting reference information.

The context help could be delivered in pop-up or overlapped windows in order to describe: the purpose of some concrete window, menu commands, ToolBar keys, dialogue elements. In case of error message or warning message (see ɔr) the context help suggests the detailed description of the arose problem and receipts to overcome it. The context help could be got in the following ways.

1. For the window:
   1.1. Push the key combination «Ctrl+F1», being located in the window, for which the reference is necessary.
   1.2. Go to the regime «?» by means of the key combination «Shift+F1» and choose the window.
2. For the dialogue element:
   2.1. Push the key «F1» or the key combination «Ctrl+F1», removing yourselves preliminary to the corresponding dialogue element.
   2.2. Go to the regime «?», pushing the question mark in the top right angle of the dialogue window and choose the corresponding element.
3. For the menu command or the ToolBar:
   3.1. Go to the regime «?» by means of the key combination «Shift+F1» and choose the command or the Toolbar.
4. For the message window:
   4.1. Push the key «Help».
   4.2. Push the key «F1»



Pic. 27. The error message window

4. Possible setups of AdvancEd

4.1 Setting up AdvancEd parameters

The following parameters of the current edit session are being saved in the special initialisation file, when exiting AdvancEd:

- sizes both of the address panel window and context help window;
- the contents of fields, states of radio-buttons and flags for all dialogues;
- states of regimes of the full-screen editor and the editor with the address panel.
- parameters of a printing.

Starting AdvancEd, there is undertaken an attempt to read mentioned parameters from the initialisation file. If this file is absent, or if file parameters are absent, or if file parameters are wrong, - values of parameters are nominated by default.

The name of the initialisation file coincides with the name of the AdvancEd executive module (see the Short description of AdvancEd files).

4.1.1 The dialogue window of setups

In the special dialogue window some setups could be defined, besides those, which belong to the edit session in AdvancEd (see סח).

The number of blanks, which are to be inserted into the current cursor position, when pushing the key «Tab» in the edit window (see the Text editor), - this number should be inputted into the field «Tab size». The field «Delay, ms» of the group «Simulation» defines the delay time in milliseconds between verification of neighbour blocks in the process of continuos verification.

The fields «The number of points for the equidistant correction» and «The tool radius for the equidistant correction» define the number of blocks, which are analyzed in the process of the equidistant correction, and the tool radius accordingly.

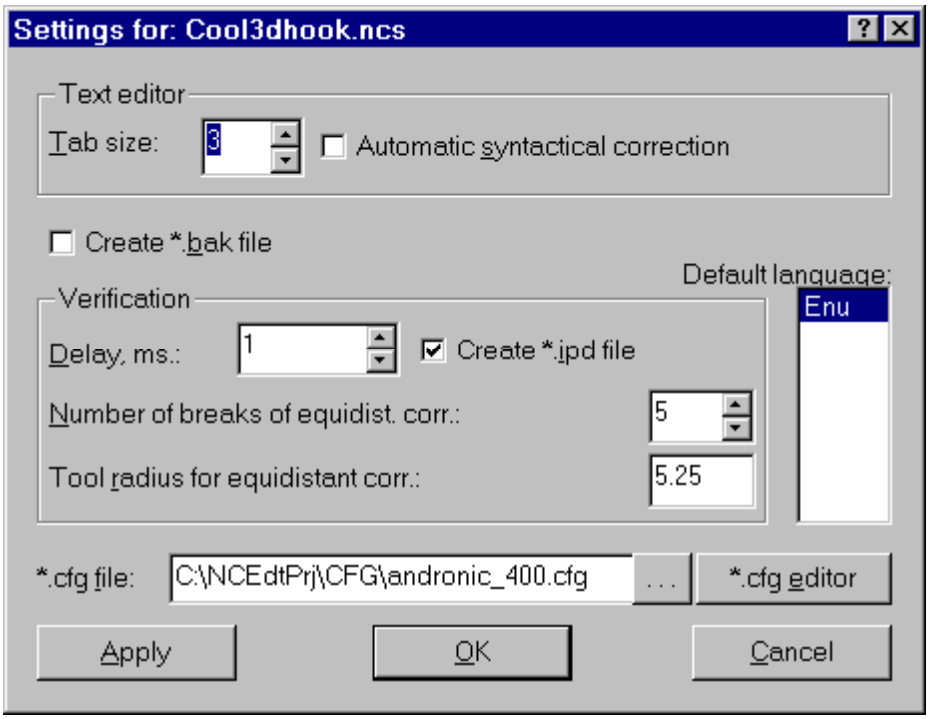
The flag «Make ipd file» defines creation of the interpolation data file; the name of this file coincides with the name of the edited file, but has the extension .ipd (see Verification of the tool trajectory).

The flag «Make bak file» finds out, whether there is created the insurance copy of the file, being opened.

The group of radio-buttons «Language» make it possible to choose the language of the user interface; if there exist dll files, containing corresponding menu resources, dialogue and message resources. To change the language, it is necessary to restart the system.

The field «CFG file» shows the name of the file, setting up AdvancEd to the concrete version of the ISO-7bit language (see Review of the open DIN language).

The key «Apply» or the key «OK», closing the dialogue, initiate fixing all setups in the initialisation file.



Pic. 28. The dialogue window of setups

4.1.2 Setting up the menu, starting external applications

In the menu «Tools» of AdvancEd there exists a possibility, using a special dialogue, - to add up to sixteen points, intended to start external applications. When adding a new point, there should be defined its name, the full path to the file of the external application, the work catalogue and the list of additional arguments, if necessary.

4.1.2.1 The dialogue window, intended to set up the menu of starting external applications

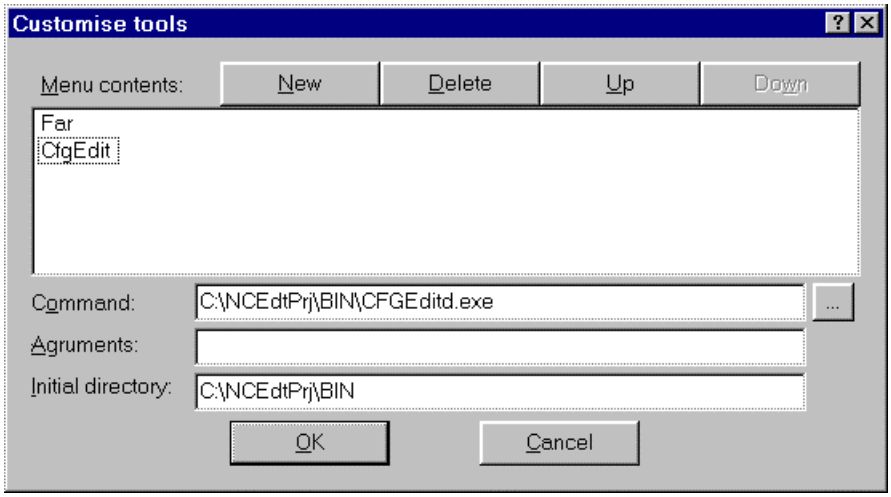
This dialogue window (see כט) is being invoked by the menu command

«Tools>Customize»; it is intended to define the contents of the menu «Tools».

The button «New» adds a new menu point, the button «Delete» deletes the point, created earlier. The buttons «Up» and «Down» make it possible to change the succession of inputted points. If the name has not been defined for some new point, this point will not be created. If the point name has been deleted, this point will be deleted. In the edit field «Command:» the name of the external application file should be defined. If necessary, to fill this field, there could be used a window, intended to search the file with the help of navigation; this window might be invoked by the button, which is respectively right to the field.

The edit field «Arguments:» is not necessary; it could contain the list of arguments, being transmitted to the external application at its start.

The edit field «Initial directory:» contains the path, which is the work one for the external application. If the value is absent in this field, the current catalogue is nominated to be the work one.



Pic. 29 The dialogue window, intended to set up the menu of starting external applications

4.1.3 The format of the initialisation file

The initialisation file is intended to save current values of setups and set up parameters of AdvancEd. This file is a text one, consisting of titles of sections, parameters and comment. The title of the section is included into the square brackets «[ ]». Each title of the section and parameter require the separate line. The length of lines should not exceed 256 symbols. All parameters are being written down into the initialisation file to the extent of either their altering in dialogue windows

or at changing AdvancEd modes. In this connection it is possible to change them manually only in the extraordinary situations.

All section titles of the AdvancEd initialisation file are submitted in the בי.

Table 12. Sections of the initialisation file

Section	Description
[Settings]	General settings of AdvancEd
[Display]	Sizes both of the address panel window and the window of the context graphical help
[PicturePropertiesDlg]	Settings of properties of the window of the context graphical help
[Text_editor]	Settings of the text editor
[TeachDlg]	Setting of teaching mode
[Emulate]	Settings of the window, intended to visualise the tool trajectory
[GotoDlg]	State of elements of the dialogue window, supporting transition to a line; these elements are those, used in the last transition
[SearchDlg]	State of elements of the dialogue window, supporting search-replace; these elements are those, used for the last search-replace operation
[ScaleDlg]	State of elements of the dialogue window, supporting scaling; these elements are those for the last scaling operation
[RenumDlg]	State of elements of the dialogue window, supporting re-numeration of blocks; these elements are those, used for the last re-numeration operation
[Recent File List]	List of last ten opened files in AdvancEd
[Tools]	List of the point of the menu «Tools»

The format, descriptions and permitted values of parameters in sections of the initialisation file, - are submitted in the גי.

Table 13. Parameters if the initialisation file

Parameter	Value	Description
Section [Settings]		
sCfgFile	C:\CFG\MY_CFG.CFG	The name of the file, setting up AdvancEd for the concrete version of the ISO-7bit language
m_iAngleX0 m_iAngleY0 m_iAngleZ0 m_iAngleX1 m_iAngleY1 m_iAngleZ1 m_iAngleX2 m_iAngleY2 m_iAngleZ2 m_iAngleX3 m_iAngleY3 m_iAngleZ3 m_iAngleX4 m_iAngleY4 m_iAngleZ4	300 0 220 270 0 270 270 0 0 0 0 0 300 0 300	Angles, which define 5 directions of view in simulation window
sWorkPath	C:\NCS\	The default path at loading flow program files and files of interpolation data
bMakeBakFile	1	The directive, whether the *.bak file of the flow program should be created (1 - yes, 0 - no)
sLanguage	Eng	The prefix, used to formulate names of files of dynamic libraries (NcEdtCOMResEng.DLL, NcEdtCOMResGer.DLL, NcEdtCOMResRus.DLL, MFC42Ger.DLL, MFC42Rus.DLL),

		these libraries contain localised resources of the user interface (Eng - English, Ger - German, Rus - Russian).
SblockPath	C:\NCS\	The default path, used to load blocks from files
bSimulateMode	1	Indication, whether the simulation mode is available: (1 - available; 0 - unavailable)
iPageLeft iPageTop iPageRight iPageBottom	2500 2500 2500 2500	Values of margins, when printing the document

Parameter	Value	Description
Section[Display]		
iAddressWidth	222	The width of the address panel [in pixels] (51 .. 699)
iPictureHeight	195	The height of the window of the context graphical help [in pixels](51 .. 396)
bWatch	1	Edit mode (0 - the full-screen text editor; 1 - the editor with the address panel and the context graphical help)
Section [PicturePropertiesDlg]		
m_bScroll	1	Presence of the scrolling lines in the window of the context graphical help (1 - yes, 0 - no)
m_sXpos	50	The horizontal co-ordinate of the top left angle of the view in the window of the context graphical help [in pixels] (0 .. 65535)
m_sYpos	50	The vertical co-ordinate of the top left angle of the view in the window of the context graphical help [in pixels] (0 .. 65535)
m_iZoom	0	The way of scaling the view in the window of the graphical help (0 - without scaling; 1 - fit into the window; 2 - fit into the window proportionally)
m_iPos	1	The way of positioning the view in the window of the graphical help (0 - in accordance with values m_sXpos and m_sYpos; 1 - auto-centring)
m_bBorder	1	Presence of the border around the view in the window of the graphical help (1 - yes, 0 - no)

Parameter	Value	Description
Section [Text_editor]		
m_bCorrectSyntax	1	Switching on the automatic syntactical correction, when inputting blocks by means of the editor address panel (1/0, 1 - yes, 0 - no)
bInsert	1	State of the insertion-substitution mode: (1 - insertion, 0 - substitution)
iTab_size	3	Number of blanks, included at clicking the button "Tab"
Section [TeachDlg]		
m_iPosDataType	0	Position of an origin of coordinates (0 - Absolute, 1 - Relative, 2 - Machine)
m_bMM/INCH	1	Units of measurements
X, Y, Z, A, ...	1	State of an appropriate axis (1 - Active / 0 - Inactive)
Section [Emulate]		
m_bSimulateSkip	1	Skipping flow program blocks during the verification process (1 - yes, 0 - no)
m_iSimulationDelay	1	Delay in milliseconds between verification of neighbour blocks (1 ... 2147483647)
bMakeIPDFile	1	The directive, whether the IPD file should be created during the verification process (1 - yes, 0 - no)
ulBackgroundColor	16777215	The background colour of the window, intended to display the tool trajectory (0 ... 4294967295)
lWkLine	0	The type of the line, simulating the work movement (0 ... 4)
ulWorkMoveColor	0	The colour of the line, simulating the work movement (0 ... 4294967295)
lFstLine	2	The type of the line, simulating the rapid movement (0 ... 4)
ulFastMoveColor	16711680	The colour of the line, simulating the rapid

		movement (0 ... 4294967295)
lNameXAxis	1	The number of the horizontal axis (0 ... 15)
lNameYAxis	3	the number of the vertical axis (0 ... 15)
lMeasureType	1	Measure units (1 - inches; 0 - millimetres)
dGridDivisions	0.393701	The grid step
Parameter	**Value**	**Description**
dYsizeMIN	0.000000	The minimal value along the vertical axis
dYsizeMAX	4.724409	The maximal value along the vertical axis
dRulerDivisions	0.393701	The step of the ruler
bRulerState	1	The directive, whether the ruler should be shown (1 - yes, 0 - no)
bAutoResize	1	The directive, whether the horizontal axis should be fit into the window (1 - yes, 0 - no)
bGridState	1	The directive, whether the grid should be shown (1 - yes, 0 - no)
ulRulerColor	0	Ruler colours (0 ... 4294967295)
ulGridColor	32768	Grid colours (0 ... 4294967295)
lWkLineFit	0	The width of the work movement line (0...100)
lFstLineFit	0	The width of the rapid movement line (0...100)
bPointState	1	The directive, whether the points between neighbour blocks should be shown (1 - yes, 0 - no)
ulPointColor	255	The colour of points between neighbour blocks (0 ... 4294967295)
bEnableText	1	The directive, whether the ruler text should be shown (1 - yes, 0 - no)
bNoFractional	0	The directive, whether fractional parts in the ruler text should be shown (1 - yes, 0 - no)
dXsizeMIN	0	The minimal value along the horizontal axis
dXsizeMAX	6.299213	The maximal value along the horizontal axis
m_iSizeEQBuffer	4	The number of blocks, which are to be analyzed during the equidistant correction

Parameter	Value	Description
Section [GotoDlg]		
m_iAbsolut	1	The type of the transition to a line (1 - relative; 0 - absolute)
m_iGotoDown	1	The direction of the transition (1 - to the file end; 0 - to the beginning of the file)
m_iLineNum	200	The line number
Section [SearchDlg]		
m_cComboFindString0 ... m_cComboFindString32	string1	The list of last 32 lines, used in the search session
m_cComboReplaceString0 ... m_cComboReplaceString32	string2	The list of last 32 lines, used for replacing in search-replace sessions
m_iCase	1	The directive, whether the register should be taken into consideration during the search process (1 - yes, 0 - no)
m_iSearchDown	1	The search direction (1 - to the file end; 0 - to the beginning of the file)
m_lNumberOccurrences	20	The number of insertions of the sought line
m_iAll	1	The directive, whether all insertions should be handled (1 - yes, 0 - no)
m_iAsk	1	The directive, whether replaces should be confirmed (1 - yes, 0 - no)
m_iWord	1	The directive, whether the full word should be searched (1 - yes, 0 - no)
m_iReplace	1	The directive, whether the found insertions should be replaced (1 - yes, 0 - no)

Parameter	Value	Description
Section[ScaleDlg]		
m_iFromPos	1	Initial units of scaling (0 ... 3)
m_iToPos	3	Target units of scaling (0 ... 3)
m_dScaleFactor	0.001	The scaling coefficient
m_adScaleFactors[0] ... m_adScaleFactors[3]	1.0000 25.400	The scaling coefficient between first (second, third, forth) units
Section [RenumDlg]		
m_iStart	1	The number, starting re-numeration
m_iStep	1	The step, starting re-numeration
Section [Recent File List]		
File1 ... File10	C:\NCS\1.NCS C:\NCS\10.NCS	The name of the last opened file
Item [Tools]		
MenuName0 ... MenuName15	Tool0 Tool15	The name of the point of the menu «Tools», used to start the corresponding external program.
InitialDirectory0 ... InitialDirectory15	C:\Tool0 C:\Tool15	The name of the directory, which is the work one for the external program.
PathName0 ... PathName15	C:\Tool0\tool0.exe C:\Tool15\tool15.exe	The name of the execution file of the external program.
DefaultArguments0 ... DefaultArguments15	/Arg1 /Arg2 /Arg1 /Arg2	Arguments, being transmitted to the execution file of the external program.

4.1.3.1 Using comment

It is possible to use lines-comment in the initialisation file. The line-comment begins with the symbol «;». When reading the initialisation files, the lines-comment are being ignored.

4.2 Setting up the current version of the DIN 66025 (ISO 6893) language

4.2.1 Review of the open DIN language

The idea of the open DIN language means, that any version of DIN 66025 flow program language might be formalised according to some definite set of rules.

The basic thing is to set apart algorithmic functions of the flow program block and data structures of the block. Algorithms are represented mainly by preparatory functions, i.e. G-functions. Data structures are represented by displacement functions (X, Y, Z, I, J, K, R), by the feedrate function (F), by the speedrate function (S). Data structures should be narrated like G-functions' parameters, while G-functions themselves should be considered to be a set of commands of some virtual DIN-machine. The next important thing is to divide G-functions into some orthogonal groups. Each group means some certain functionality of its G-functions. The proper structure, with its special format (described in the די and Structure of the G-function's header), belongs to the concrete group of the commands' set.

Table 14

Field	Purposes
Group index	Group number
Modality symptom	It defines, whether the group influences the system state, i.e. G-vector
Command activity	It defines, whether the command is active by default

This structure, together with the graphic presentation file name, forms the header of the G-function in the *.cfg file.

The body of the G-function description consists of the list of parameters, i.e. the list of addresses, connected with the definite G-function. Each element of the list includes into itself the address name, minimum and maximum values, the address format, and the position of the address window in the address panel.

The next formalising step means definition of delimiters, comment, axes' names, addresses' names, G-functions' names. The corresponding lists should be defined for the DIN 66025 version as a whole, but not for the concrete G-function.

4.2.2 Description of CFG-file format

Configuration file describes the structure of the address panel, intended to edit the G-function, and also contains information about some concrete grammar version of the DIN 66025 language. Configuration file has a rigid format, which is described below.

CFG-file is a text one, consisting of options, sections, devoted to G-functions, and comment. For each option, header of the G-function and parameter of the G-function it is necessary to allocate separate line.

Length of CFG file line should not exceed 256 characters.

4.2.2.1 Options

The following parameters might be set as options for this version of the DIN language 66025:

- properties of the configuration file;
- the comment;
- delimeters;
- the set of possible names of G-functions;
- the set of possible names of addresses of G-functions;
- the set of possible names of axes of G-functions;
- the set of possible parameters' names of g-functions.

The format of options is submitted in the ы.

Table 15

Parameter	Value	Description
Delimiters	« \r\t\n,<>»	The list of conceivable delimiters
Comment	«%*;»	The list of conceivable comment
Address	«N M S T F I J K R»	Sequence of lines, separated by blanks, which defines a set of possible G-function addresses' names
Axis	«X Y Z A B C»	Sequence of lines, separated by blanks, defining a set of possible names of axes of G-functions
Functions	«G»	Sequence of lines, separated by blanks, defining a set of possible names of G-functions
Parameters	« N= »	Succession of lines, separated by blanks, defining a set of possible parameters' names of g-functions
Title	File title	The title of the file
Author	File author	The author (authors) of the file
File_Comments	File comment	The comment to the file
Company	STANKIN NCs	The company-developer of the file
NC_type	Type of NC system	The type of the NC system

The G-functions names, which are not included into the options «Functions», are ignored by the system. Addresses and the axes, which are not included into options «Address» and into options «Axis», are accordingly ignored when converting files, scaling and re-numerating.

The option «Parameters» describes addresses, which values are lines. Such addresses are parameters of G-functions, invoking sub-programs and macros. Names of such addresses should obligatory be followed by the symbol «=».

4.2.2.2 Structure of the G-function's header

The header consists of successively enumerated (in any order) options and their values, divided by generalised blanks; see the ʊт.

Table 16. Options of the G-function header

Header options	Value	Description
G	00	Function name is a sequence of one letter and any three digits
graphic	BMP\G00.BMP	Full name with a path of the view file, corresponding to the function - up to 240 symbols
modal	1	Unmodal/modal function, (0/1)
default	0	Inactive/active by default, (0/1)
groupindex	0	Number of the group (0-31)

When *.bmp-file is being created, - it is better to use 256 colors.

While creating the CFG-file, - it is necessary to describe the unmodal (modal=0) G-function, without pointing out the value header for G-option, and with the parameter, groupindex=0. This G-function will be reflected by default, i.e. the description of this G-function parameters will define addresses, being displayed in the address panel, if G-functions are missing in the current line of the text editor.

4.2.2.3 Structure of G-function parameters

A list of G-function's parameters defines:

- possible addresses;
- the layout of address windows in the address panel.

The succession of parameters' set defines the succession of addresses in the flow program block, when transforming the block into the standard form. It also defines the succession of addresses values, when inputting the block into the address panel. Every G-function parameter submits a sequence of successively enumerated attributes, divided by colons. The parameter format is shown in the ד.

Table 17

	Values of attributes	Description
:	Y	Parameter name
:	Line axis	Comment, which will be displayed in StatusBar
:	v999.99	The parameter format; v-designates presence of the sign, an amount of digits 9 designate an amount of bits accordingly before and after a comma
:	-999.99/999.99	Range of parameter values: min/max.
:	0.5	X-co-ordinate of parameter position at the screen, - float
:	2	Y-co-ordinate of parameter position at the screen, -float
:T	000,000,000/ 192,192,195	Colour in the RGB format, used to display the parameter name at the screen: foreground/background, - (000,000,000/255,255,255)
:C	000,000,000/ 255,255,255	Colour in the RGB format, used to display the parameter edit line at the screen: foreground/background - (000,000,000/255,255,255)

To define the parameter like exception for the given G-function, its name could be shown parenthetically, for instance «(N)» or «(Y)». The exception means the following:

- if the parameter's name is «N», then it is being ignored at re-numeration;
- if the parameter's name is mentioned in the «Address» option, then it is being ignored at scaling.

If one G-function describes parameters with the same names (the first is an address, another is an exception; for instance: N10 G95 N20), it should be done the following. The description of the first parameter in the parameter's list should precede the description of the parameter, the name of the function (normally - «G»); while the description of the second parameter should follow it.

Example:

```
G95   graphic=..\pcx\g95_e.pcx modal=1 default=0 groupindex=14
:N    :Block number              :9999999    :0/9999999            :11.25 :1   :T000,000,000/198,198,198 :C000,000,000/255,255,255
:G    :Time programming (k/min.) :99         :0/99                 :11.25 :1   :T000,000,000/198,198,198 :C000,000,000/255,255,255
:(N)  :Multiplication factor     :v99999.99  :-99999.99/99999.99 :0.25  :7   :T000,000,000/198,198,198 :C000,000,000/255,255,255
```

For addresses, pointed out in the list «Parameters», there is used another format of attributes, shown in the ו.

Table 18

	Value of the attribute	Description
:	N=	the name of the parameter
:	Macro name	the comment, being shown in the StatusBar
:	###############	the format of the parameter; the number of "#" symbols corresponds to the maximal quantity of symbols in the value of the parameter
:	0.5	X-co-ordinate of parameter position at the screen, - float
:	2	Y-co-ordinate of parameter position at the screen, -float
:T	000,000,000/ 192,192,195	Colour in the RGB format, used to display the parameter name at the screen: foreground/background, - (000,000,000/255,255,255)
:C	000,000,000/ 255,255,255	Colour in the RGB format, used to display the parameter edit line at the screen: foreground/background - (000,000,000/255,255,255)

If the parameter's name is not described in options «Address», «Axis», «Functions», «Parameters», then attributes, defining the scope and format of this parameter are being ignored; and the address panel displays only its name

4.2.2.4 The full number of G-function sections

Here only an example of the section for G93 function has been presented.

```
G93 graphic=bmp\g93.bmp modal=1 default=0 groupindex=13
:N :Block number :99999 :0/99999 :0.5 :2 :T000,000,000/198,198,198 :C000,000,000/255,255,255
:G :Function number :99 :0/99 :12 :2 :T000,000,000/198,198,198 :C000,000,000/255,255,255
```

Sections for other G-functions are the same.

4.2.2.5 Using comment

Comment could be used in the CFG file with the help of symbols either «//» or «;». In string values, closed by quotation marks, comment does not work and are perceived like string elements. Example:

```
// this is a comment
```

:N :Block number :9999 :0/9999999 :0.5 :2 :T000,000,000/198,198,198 :C000,000,000/255,255,255 ;this is a comment Comment="%;*" (in this case ";" - is not a comment, but a value).

5. Description of warnings and error messages

Warnings and error messages of AdvancEd are appearing in corresponding windows (see זכ); and crucial messages are being written down in the special file error.log with time and data of the error. The description of warnings and error messages of AdvancEd, and methods of error treatment is submitted in the טי.

Table 19

Warning or error message	Restart the program to finish operations, intended to change the language
Methods of treatment	Restart the program, make sure, that the resource DLL exists for the chosen language (For English - NcEdtCOMResEng.dll, for German - NcEdtCOMResGer.dll, for Russian - NcEdtCOMResRus.dll)
Warning or error message	The error of reading the graphical file: DIB is too large
Methods of treatment	Check correctness of the DIB or BMP file, decrease its volume, if necessary
Warning or error message	The error of reading the graphical file: unknown graphical format
Methods of treatment	Check the format of the graphical file; at error create the file anew or restore it from the reserve copy; if the file format is not DIB, BMP or WMF, - convert into one of such formats
Warning or error message	The error of reading the graphical file: impossible to read the contents of the DIB-file title
Methods of treatment	Check correctness of the DIB or BMP file; at error create the file anew or restore it from the reserve copy
Warning or error message	The error of reading the graphical file: the reason is described by the operating system
Methods of treatment	Check the format and integrity of the graphical file and absence of errors in the hard disk; at error create the file anew or restore it from the reserve copy
Warning or error message	The error of reading the graphical file: it is impossible to read the contents of the DIB-file

Methods of treatment	Check correctness of the DIB or BMP file; at error create the file anew or restore it from the reserve copy
Warning or error message	The line can not be longer than 1024 symbols
Methods of treatment	Decrease the line length in the text editor
Warning or error message	Wait for the end of the operation
Methods of treatment	Wait for the finish of the current operation; in case of coercive finish of the program, - data will be lost
Warning or error message	The error of opening the *.cfg file: the reason is described by the operating system
Methods of treatment	Check the format and integrity of the configuration file, and absence of errors in the hard disk; at error create the file anew or restore it from the reserve copy
Warning or error message	The error of initialising OLE
Methods of treatment	Reset the program; in case of repeat - reset the whole operating system
Warning or error message	The scaling coefficient is wrong
Methods of treatment	Correct the value of the scale coefficient
Warning or error message	The error of reading WMF file, the reason is: the error of creating the file reflection in the RAM memory
Methods of	Check the size and correctness of the WMF file; if necessary

treatment	- restore from the reserve copy; free the memory, unloading applications, not used
Warning or error message	The error of reading WMF file, the reason is: the error of reflecting the object in the RAM memory
Methods of treatment	Check the size and correctness of the WMF file; if necessary - restore from the reserve copy; free the memory, unloading applications, not used
Warning or error message	The error of reading WMF file, the reason is described by the operating system (SetWinMetaFileBits failed)
Methods of treatment	Check the size and correctness of the WMF file; if necessary - restore from the reserve copy
Warning or error message	The error of reading WMF file, the reason is described by the operating system (SetWinMetaFileBitsEx failed)
Methods of treatment	Check the size and correctness of the WMF file; if necessary - restore from the reserve copy
Warning or error message	The error of reading WMF file, the reason is described by the operating system (GetMetaFile failed)
Methods of treatment	Check the size and correctness of the WMF file; if necessary - restore from the reserve copy
Warning or error message	The error of reading WMF file, the reason is described by the operating system (GetMetaFileBitsEx failed)
Methods of treatment	Check the size and correctness of the WMF file; if necessary - restore from the reserve copy
Warning or error message	The error of allocating the memory, while reading the WMF file, the reason is described by the operating system
Methods of	Decrease the size and check correctness of the WMF file; if

treatment	necessary - restore from the reserve copy; free the memory, unloading applications, not used
Warning or error message	The error of creating the temporary file, the reason is described by the operating system
Methods of treatment	Treat the reason of the error in accordance with description of the operating system. Check correctness of setting the system variable «TEMP»; check availability of path, to which it points out; check free area at the disk, along this path
Warning or error message	The error of creating the *.bak file, the reason is described by the operating system
Methods of treatment	Treat the reason of the error in accordance with description of the operating system. Check free area in the disk, where the edited file had been opened
Warning or error message	The group of G-functions is wrong, the given function is absent in the group under the corresponding number
Methods of treatment	Correct the number of the G-function in such a way, that the number substitution should be carried out inside the group of the current G-function
Warning or error message	The number of the G-function is wrong
Methods of treatment	Substitute the number of the G-function for one, described in the configuration file of G-functions
Warning or error message	The error of reading the *.cfg file, the reason is: the symbol ":" is not found in the line
Methods of treatment	Correct the description of the parameter of the G-function in the corresponding line of the configuration file

Warning or error message	The error of reading the *.cfg file, the reason is: the symbol "/" is not found in the line
Methods of treatment	Correct the description of the parameter of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line ":T" is not found in the line
Methods of treatment	Correct the description of the parameter of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line ":C" is not found in the line
Methods of treatment	Correct the description of the parameter of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the symbol "," is not found in the line
Methods of treatment	Correct the description of the parameter of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line "graphic=" is not found in the line
Methods of treatment	Correct the description of the header of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line "modal=" is not found in the line
Methods of treatment	Correct the description of the header of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line "default=" is not found in the line

Methods of treatment	Correct the description of the header of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the sub-line "groupindex=" is not found in the line
Methods of treatment	Correct the description of the header of the G-function in the corresponding line of the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the value of the parameter "Functions=" is not defined
Methods of treatment	Add or correct the description of the parameter "Functions=" in the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the value of the parameter "Address=" is not defined
Methods of treatment	Add or correct the description of the parameter "Address=" in the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the value of the parameter "Axis=" is not defined
Methods of treatment	Add or correct the description of the parameter "Axis=" in the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the value of the parameter "Delimiters=" is not defined
Methods of treatment	Add or correct the description of the parameter "Delimiters=" in the configuration file
Warning or error message	The error of reading the *.cfg file, the reason is: the value of the parameter "Comment=" is not defined
Methods of treatment	Add or correct the description of the parameter "Comment=" in the configuration file