

MT-CNC Cycle Handling V16

User Interface: Cycle Handling V16

DOK-MT*CNC-BOF*ZYH*V16-ANW1-EN-P

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1 General

NC-cycles are subprograms stored in the NC-memory. They are called from the mainprogram using the following instruction:



BSR .LABEL ,

where *LABEL* represents the cycle's name (max. 6 characters).

Programmers need only to remember the NC-cycle name without having to remember all the instructions in the NC-cycle itself. The most significant points on NC-cycles are that NC-variables can be used in the NC-cycles, operations can be performed on NC-variables and actual values can be assigned to NC-variables with the NC-cycle-call. This means, that a function of general use can be formed when programming a certain function as an NC-cycle. Similar workpieces or machining cycles can be collected as a group and a universal NC-cycle can be programmed using NC-variables applicable to each group. In this way, programming is not required for the workpieces in the group. The programmer only needs to assign actual values to the NC-variables.

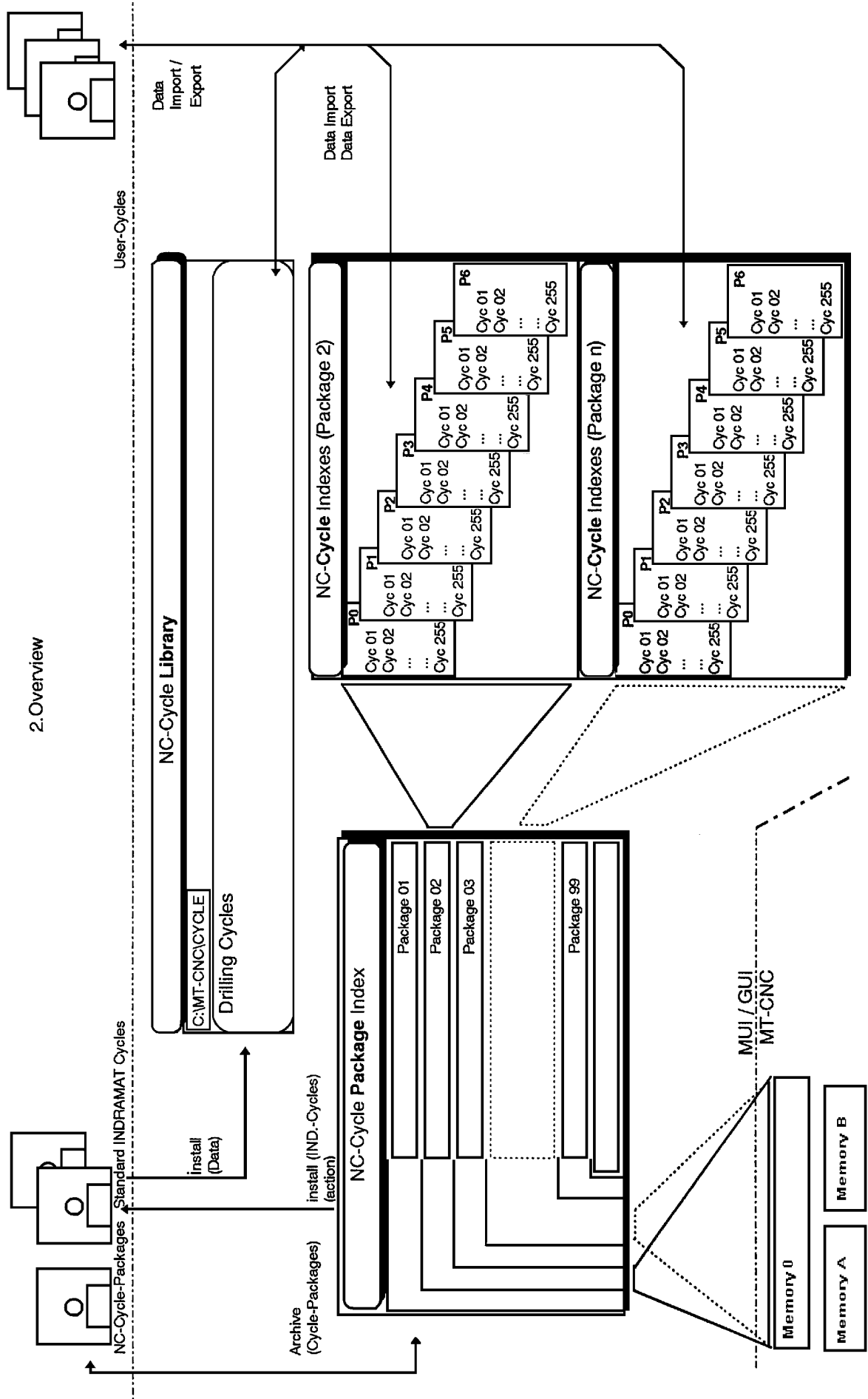
Because the MT-CNC is capable to control multiple stations (process 0 to process 6) of different kind and technology, it is necessary to provide each station with a separate index of NC-cycles. The NC-cycle indexes of each process are combined in NC-cycle packages.

Physically an NC-cycle package is transmitted into the NC-program memory as Program no. 0, and can be accessed by either the NC-program package in memory A or B. The maximum number of NC-cycle packages that can be handled in the NC-cycle package index are 99 with a maximum number of 255 NC-cycles each.

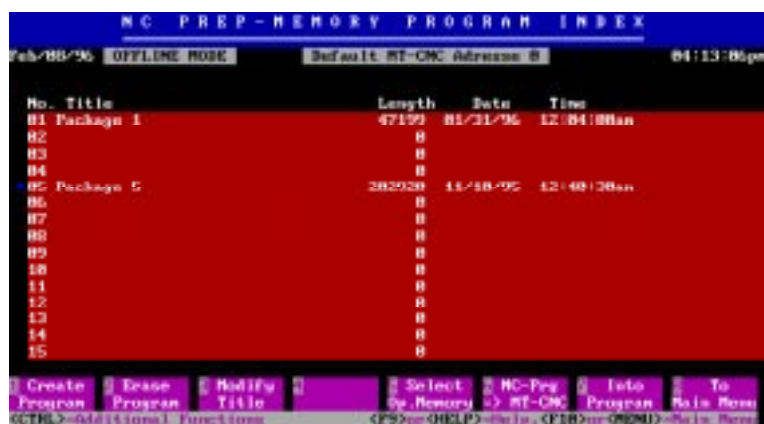
The NC-cycle handling is a subitem of the NC-program handling in the MUI. It is called by keycombination  +  in the NC-program package index.

The following diagram shows the structure of the NC-cycle handling in the MUI of the MT-CNC.

2 Overview



3 Select NC-cycle handling

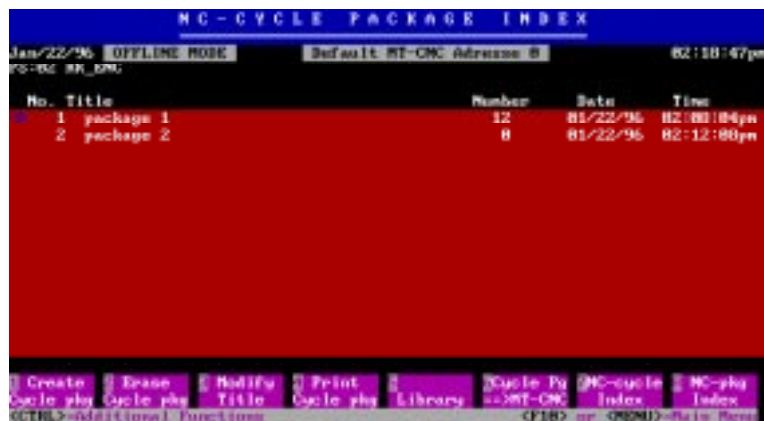


Picture 1 NC-cycle handling

The NC-cycle handling is a subitem of the NC-program handling in the MUI.



Picture 2 Edit NC-cycles



Picture 3 NC-cycle package index

It is called by keycombination **Ctrl** + **F7** [EDIT NC-cycles] in the NC-program package index which leads to the NC-cycle package index.

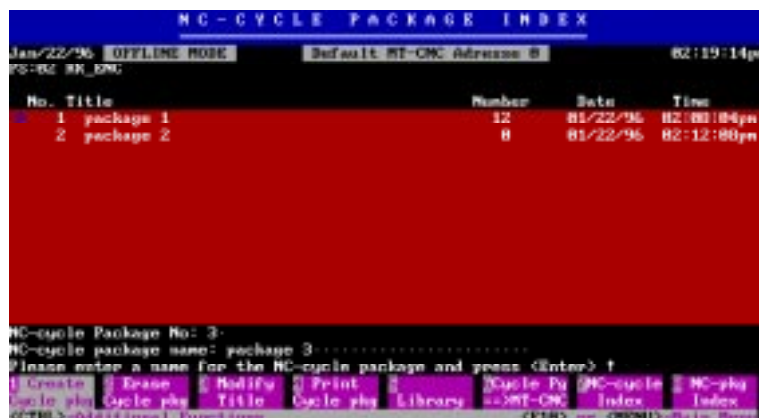
The selection of the NC-cycle handling is protected by password.

In the NC-cycle package index the following operations are offered:

1. softkey line
 - Create NC-cycle package
 - Delete NC-cycle package
 - Rename NC-cycle package
 - Print NC-cycle package
 - NC-cycle library
 - Transmit NC-cycle package
 - Edit NC-cycle package
 - Return to NC-package index
2. softkey line
 - Install NC-cycles
 - Archive
 - Retransmit NC-cycle package
 - Station index

4 NC-cycle package index

4.1 Create NC-cycle package



Picture 4 Create cycle pkg

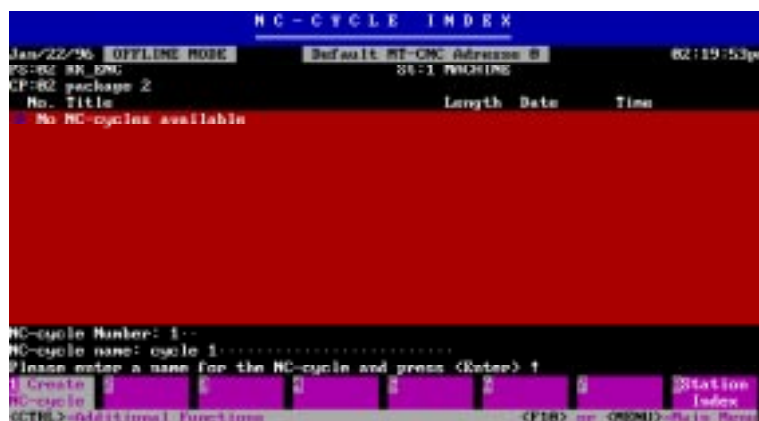
By pressing **F1** [Create Cycle pkg] a new NC-cycle package can be entered to the NC-cycle package index. An index number and NC-cycle package name must be entered in the bottom line. If no or an invalid name was input or an already existing index number, an error message will be generated.

Pressing **F7** [NC-cycle index] or **Enter** leads to the NC-cycle index of the selected process.

In the NC-cycle index the following operations are offered:

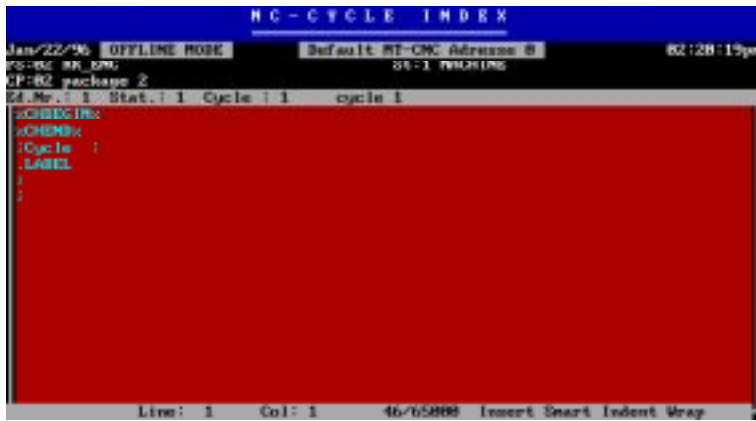
1. Create NC-cycle
2. Copy NC-cycles from existing NC-cycle indexes
3. Copy NC-cycles from drives or NC-cycle library

4.1.1 Create NC-cycle



Picture 5 Create NC-cycle

By pressing **F1** [Create NC-cycle] a new NC-cycle can be entered to the NC-cycle index. An index number and NC-cycle name must be entered in the bottom line.

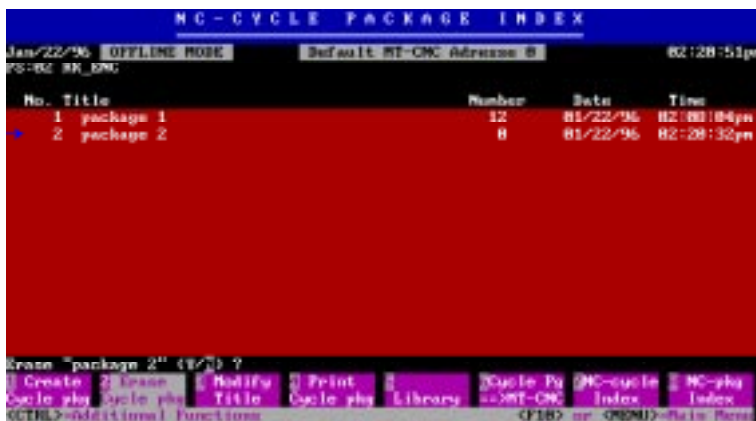


Picture 6 Edit NC-cycle

Pressing **F7** [edit NC-cycle] or simply **Enter** calls the Editor.

If no or an invalid name was input an error message will be generated.

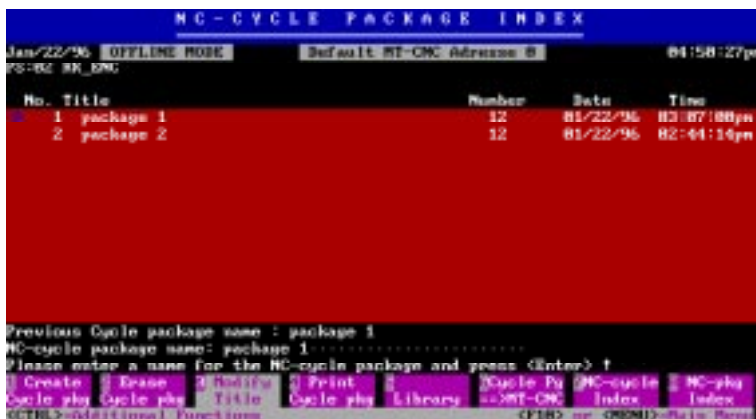
4.2 Delete NC-cycle package



Picture 7 Erase cycle pkg

Pressing **F2** [Erase Cycle pkg] selects the NC-package at the cursor position to be deleted. This operation needs to be confirmed in the bottom line.

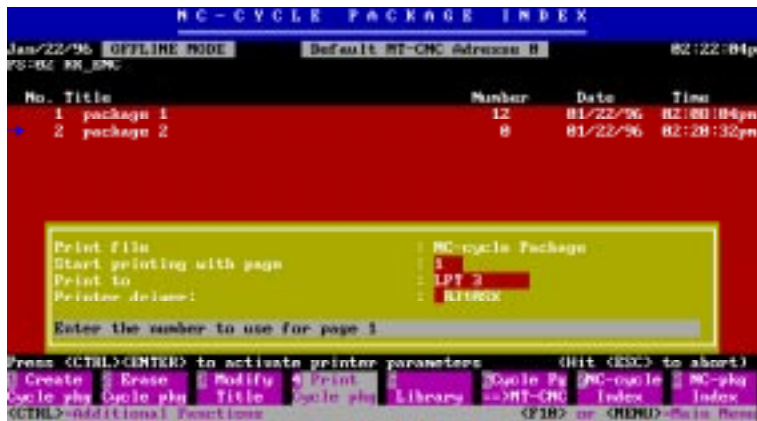
4.3 Rename NC-cycle package



Picture 8 Modify Title

Pressing **F3** [Modify Title] selects the NC-cycle package at the cursor position to be renamed. In the bottom line the previous name is displayed and the new name can be entered (max. 32 characters).

4.4 Print NC-cycle package



Picture 9 Print cycle pkg

Pressing **F4** [Print Cycle pkg] selects the NC-cycle package at the cursor position to be printed. In a window parameters for the print job can be set. Pressing **Ctrl** + **Enter** starts the output.

4.5 NC-cycle library



Picture 10 Library

The NC-cycle library is a cycle index for all connected CNC's and their processes in which up to 1000 cycles can be stored. The Standard INDRAMAT-Cycles are installed into this library and can be viewed but not modified. Further more user cycles can be created, modified, renamed or deleted. All NC-cycles of the library are on disposal for the connected CNC's and their processes and can be allocated to the individual NC-cycle indexes.

4.5.1 Create NC-cycle



Picture 11 Library, new Nc-cycle

By pressing **F1** [Enter NC-cycle] a new NC-cycle can be entered to the Library. An index number and NC-cycle name must be entered in the bottom line.

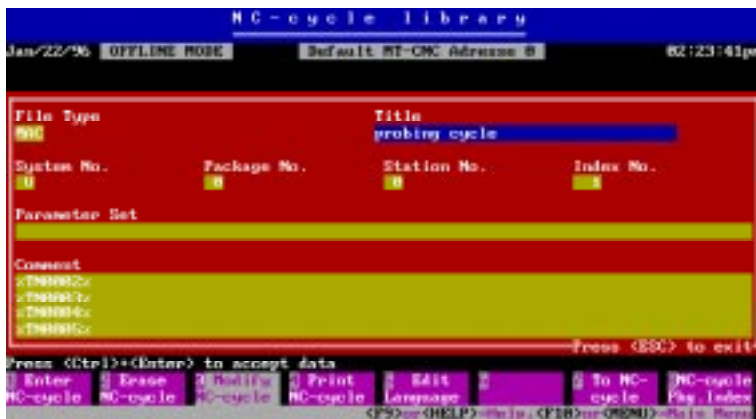
4.5.2 Delete NC-cycle



Picture 12 Library, erase Nc-cycle

Pressing **F2** [Erase NC-cycle] selects the NC-cycle at the cursor position to be deleted. This operation needs to be confirmed in the bottom line.

4.5.3 Rename NC-cycle



Picture 13 Library, Modify NC-cycle

Pressing **F3** [Modify NC-cycle] selects the NC-cycle at the cursor position to be renamed. Detailed data of the selected cycle are displayed in a window. The cursor is at the position, where the name of the NC-cycle can be modified (max. 32 characters). **Tab** or **Enter** switches the cursor to a position where a comment of max. 4 lines can be input. **Ctrl** + **Enter** accepts the data and closes the window.

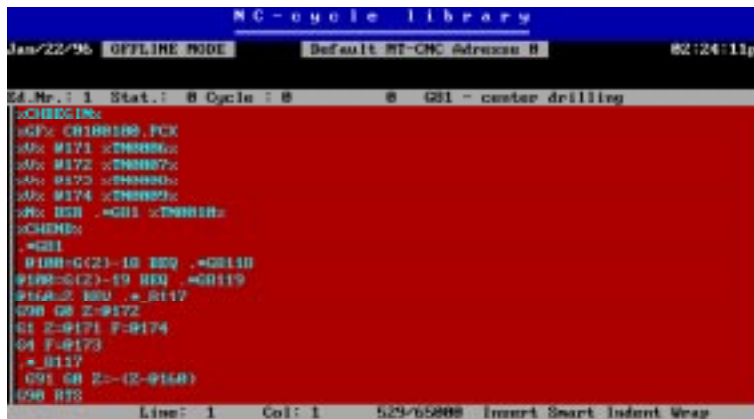
4.5.4 Print NC-cycle



Picture 14 Library, Print NC-cycle

Pressing **F4** [Print NC-cycle] selects the NC-cycle at the cursor position to be printed. In a window parameters for the print job can be set. Pressing **Ctrl** + **Enter** starts the output.

4.5.5 Edit NC-cycle (User-cycles)



```

NC-cycle library
Jan/22/96 OFFLINE NODE Default MT-CNC Address B 02:24:11pm
Ed.Nr.: 1 Stat.: 0 Cycle: 0 0 G31 - center drilling
:CHRGIT:
:GF: CR100100.PCX
:G: M171 <TNR000:
:G: M172 <TNR007:
:G: M173 <TNR000:
:G: M174 <TNR000:
:G: BSR .<G31 <TNR000:
:GENE:
.<G31
#100=<G(2)-10 BQJ .<G3110
#100=<G(2)-10 BQJ .<G3110
#100=<G(2)-10 BQJ .<G3110
G90 G0 Z->Z117
G01 G0 Z->Z172
G1 Z->Z171 F->F174
G1 F->F173
.<G3117
G91 G0 Z->(Z->Z150)
G90 B15
Line: 1 Col: 1 525/65000 Insert Smart Indent Wrap

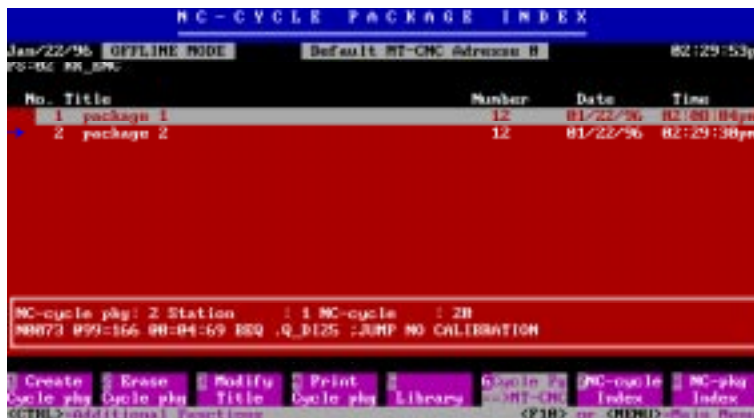
```

Picture 15 Library, To NC-cycle

By pressing **F7** [To NC-cycle] or **Enter** the NC-cycle at the cursor position is loaded into the Editor. (See appendix for detailed description of the Editor)

Also Standard INDRAMAT-Cycles can be viewed but not modified in the library.

4.6 Transmit NC-cycle package



```

NC-CYCLE PACKAGE INDEX
Jan/22/96 OFFLINE NODE Default MT-CNC Address B 02:29:53pm
PC-BOF MR_076
No. Title Number Date Time
1 package 1 12 01/22/96 02:10:10pm
2 package 2 12 01/22/96 02:29:38pm
NC-cycle pkg: 2 Station : 1 NC-cycle : 2R
#M73 #99-166 #0-04-69 BQJ .Q_D125 :JUMP NO CALIBRATION
Create Erase Modify Print Cycle Pg NC-cycle
Delete pkg Delete pkg Title Delete pkg Library --MT-CNC Index NC-pkg
CTRL=additional functions <F10> or <CTRL>->Main Menu

```

Picture 16 Cycle Pg => MT-CNC

Pressing **F6** [Cycle Pg => MT-CNC] immediately initiates the NC-cycle package at the cursor position to be transferred into the MT-CNC program memory. An error message will be generated, if the cursor is at the aktiv NC-cycle package that is marked with a bar.

4.7 Edit NC-cycle package

Pressing **F7** [NC-cycle index] or **Enter** leads to the NC-cycle index of the selected process.

4.7.1 Create NC-cycle



By pressing **F1** [Create NC-cycle] a new NC-cycle can be entered to the NC-cycle index. An index number and NC-cycle name must be entered in the bottom line. An error message will be generated, if an already existing index number or an invalid name was input.

Picture 17 Edit NC-cycle package, Create NC-cycle

4.7.2 Delete NC-cycle



Pressing **F2** [Erase NC-cycle] selects the NC-cycle at the cursor position to be deleted. This operation needs to be confirmed in the bottom line.

Picture 18 Edit NC-cycle package, Erase NC-cycle

4.7.3 Rename NC-cycle



Picture 19 Edit NC-cycle package, Modify Title

Pressing **F3** [Modify NC-cycle] selects the NC-cycle at the cursor position to be renamed. Detailed data of the selected cycle are displayed in a window. The cursor is at the position, where the name of the NC-cycle can be modified (max. 32 characters). **Tab** or **Enter** switches the cursor to a position where a comment of max. 4 lines can be input. **Ctrl**+**Enter** accepts the data and closes the window.

4.7.4 View NC-cycle

By pressing **F6** [View NC-cycle] the NC-cycle at the cursor position is displayed.

4.7.5 Edit NC-cycle

By pressing **F7** [Edit NC-cycle] or **Enter** the NC-cycle at the cursor position is loaded into the Editor. (See appendix for detailed description of the Editor)

4.7.6 Station index



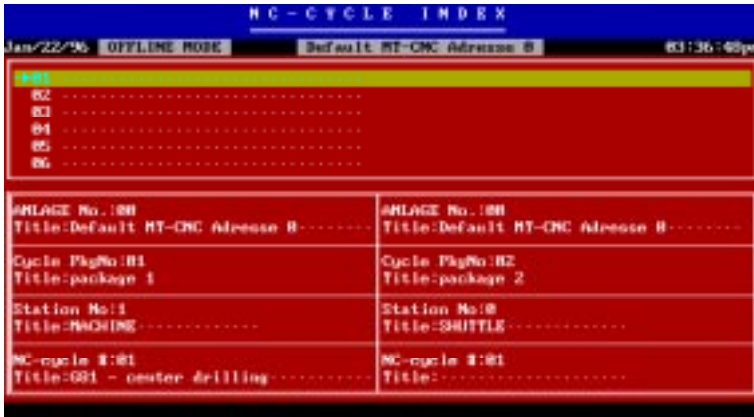
Picture 20 Station index

By pressing **F8** [Station index] the station index is displayed and another process can be selected with cursor and **Enter**. If the the system consists only of a single process, this softkey will not be displayed.

4.8 NC-package index

Pressing **F8** exits NC-cycle-handling and leads back to the NC-package index.

4.9 Copy NC-cycle



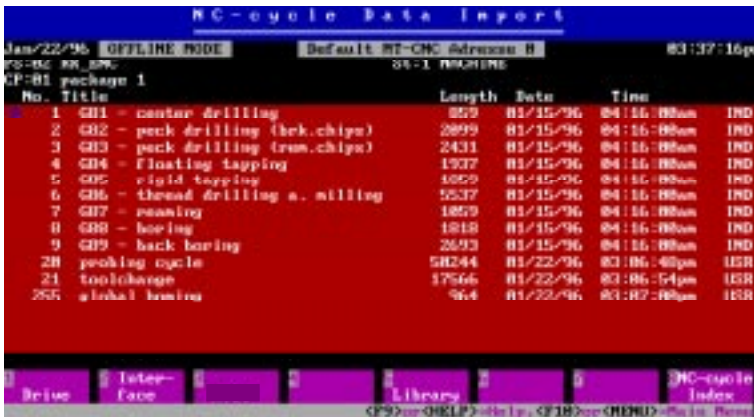
Picture 21 Copy NC-cycle

By pressing **Ctrl** + **F1** [Copy NC-cycle] the CNC overlapping copy function is initiated. In a window the source file and target needs to be determined sequentially, starting with CNC number, NC-cycle package number, process number and cycle number of the selected NC-cycle index.

In order to simplify the selection, possible choices are displayed in another window and can be selected by moving the cursor to the desired item and pressing **Enter**.

If the file already exists in the target NC-cycle index, the system asks for confirmation to overwrite.

4.10 Import Data



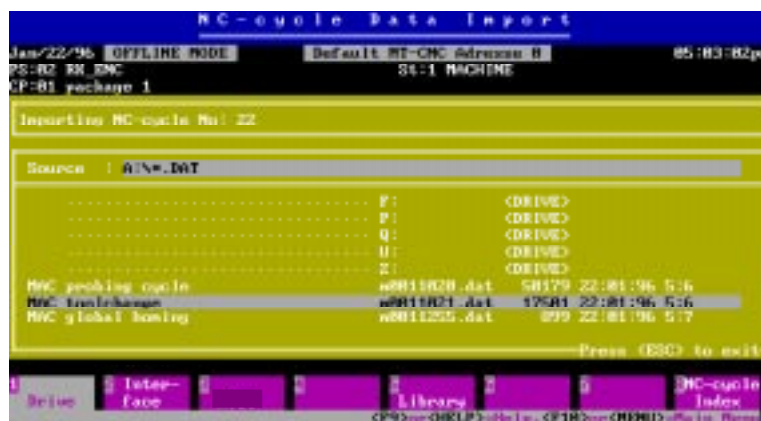
Picture 22 Import Data

Using the data import function **Ctrl** + **F2** [Import Data] NC-cycles can be read from drive, serial interface or NC-cycle library into the actual NC-cycle index.

A new softkey line offers the three sources as follows:

- **F1** [Drive]
- **F2** [Interface]
- **F5** [Library]

4.10.1 Import Data from drive



Picture 23 Import Data from drive

After pressing **F1** [Drive] the system asks for an unused index number in the range of 1 to 255. **Enter** opens a file selection window, that is splitted in two parts. In the upper window the filename of the file to be read can be input (drive:\path\filename). In the lower window drive-, path- and file selection can be done using cursor and **Enter**.

Pressing the **Tab** key toggles between the two windows.

4.10.2 Import data from serial interface



Picture 24 Import data from serial interface

After pressing **F2** [Interface] the system asks for an unused index number in the range of 1 to 255. **Enter** initiates data input from serial interface. Communication parameters are set in the SETUP of the MUI (main menu, **Shift** + **F1**).

After pressing **Enter**, the system is in a 'ready to receive' status and the progress of transmission is displayed in a window as soon as data are received.

4.10.3 Import Data from NC-cycle library



Picture 25 Import Data from NC-cycle library

Pressing **F5** [Library] initiates data input from the NC-cycle library. At the bottom line the system asks for an unused index number in the range of 1 to 255.



Picture 26 Import Data from NC-cycle library

After pressing **Enter** the NC-cycle library index is displayed and an NC-cycle can be selected using the cursor and **Enter**.

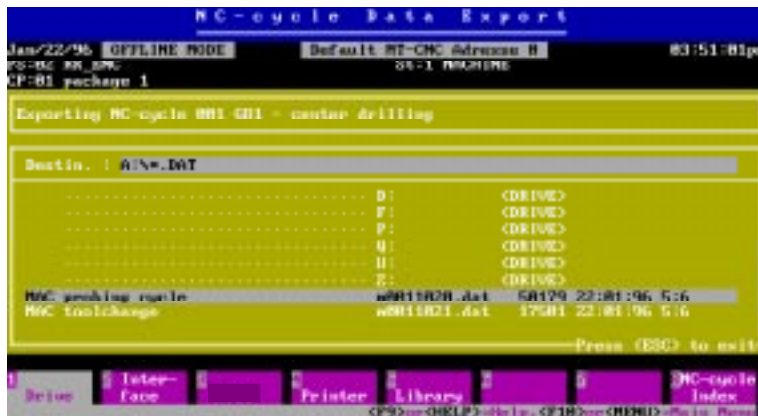
4.11 Export Data

Using the data export function **Ctrl**+**F3** [Export Data] NC-cycles from the actual NC-cycle index can be output to drive, serial interface, printer or NC-cycle library.

A new softkey line offers the following destinations:

- **F1** [Drive]
- **F2** [Interface]
- **F4** [Printer]
- **F5** [Library]

4.11.1 Export Data to Drive



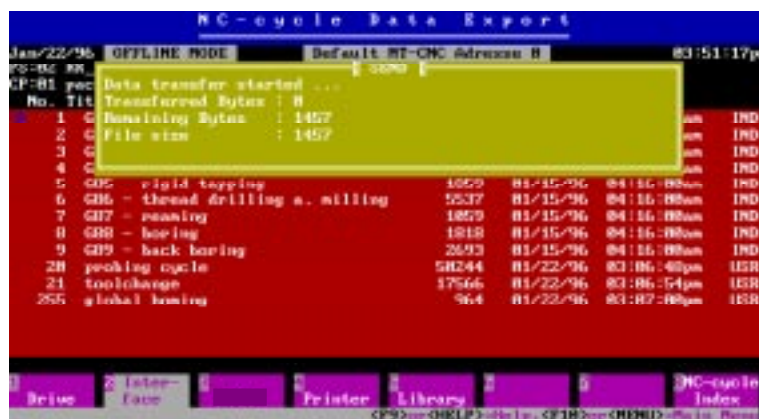
Picture 27 Export Data to Drive

Pressing **F1** [Drive] opens a file selection window, that is splitted in two parts. In the upper window the filename of the file to be output can be overwritten (drive:\path\filename).

In the lower window drive-, path selection can be done using cursor and **Enter**.

Pressing the **Tab** key toggles between the two windows.

4.11.2 Export Data to serial interface



Picture 28 Export Data to serial interface

Pressing **[F2]** [Interface] initiates data output to serial interface. Communication parameters are set in the SETUP of the MUI (main menu, **[Shift]** + **[F1]**).

After pressing **[Enter]**, the systems starts transmitting the NC-cycle at the cursor position. The progress of transmission is displayed in a window.

4.11.3 Export Data to printer



Picture 29 Export Data to printer

Pressing **[F4]** [Print NC-cycle] selects the NC-cycle at the cursor position to be printed. In a window parameters for the print job can be set.

Pressing **[Ctrl]** + **[Enter]** starts the output.

4.11.4 Export Data to NC-cycle library



Picture 30 Export Data to NC-cycle library

By pressing **[F5]** [Library] the NC-cycle at the cursor position can be copied into the NC-cycle library. At the bottom line a library index number and a cycle name must be input.

Pressing **[Enter]** starts the output.

4.12 Install NC-cycles



Picture 31 Install NC-cycles

Standard INDRAMAT-Cycles are delivered on floppy disc. These need to be installed into the NC-cycle library.

Pressing **Ctrl** + **F4** [Install NC-cycles] in the NC-cycle package index opens a window for drive selection.

The floppy disc containing the Standard INDRAMAT-Cycles should be inserted into the floppy drive at this time. The drive containing the required data can be selected using the cursor.

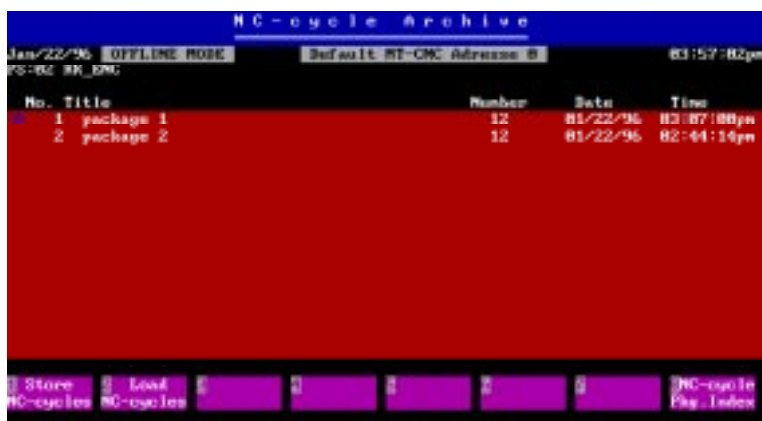


Picture 32 Standard INDRAMAT-Cycles

After pressing **Enter** the tree of the selected drive is displayed in another window.

The Standard INDRAMAT-Cycles are in the root directory of the floppy disc. If the contents of the floppy disc was copied onto a different drive, the concerning path can be selected by cursor. **Enter** starts the installation and the progress of data transfer is displayed at the bottom line. The NC-cycles installed can be viewed in the NC-cycle library afterwards.

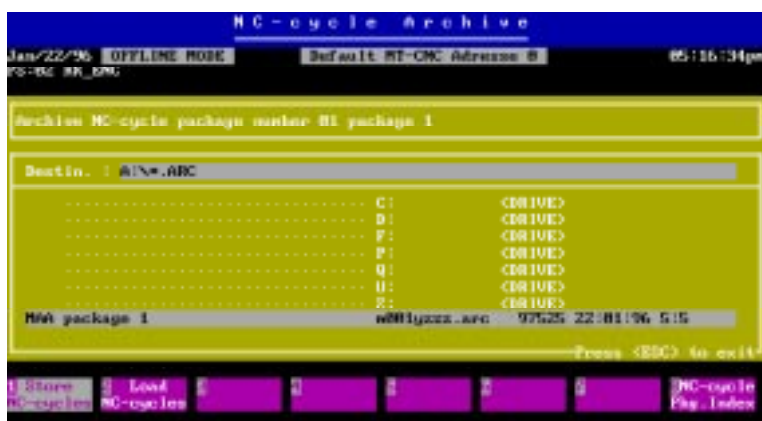
4.13 Archive (NC-cycle package)



Picture 33 Archive

Using the archive function, NC-cycles packages can be stored on any available drive. After pressing **F5** [Archive] a new softkeyline offers **F1** [Store NC-cycles] and Load NC-cycles.

4.13.1 Store NC-cycle package

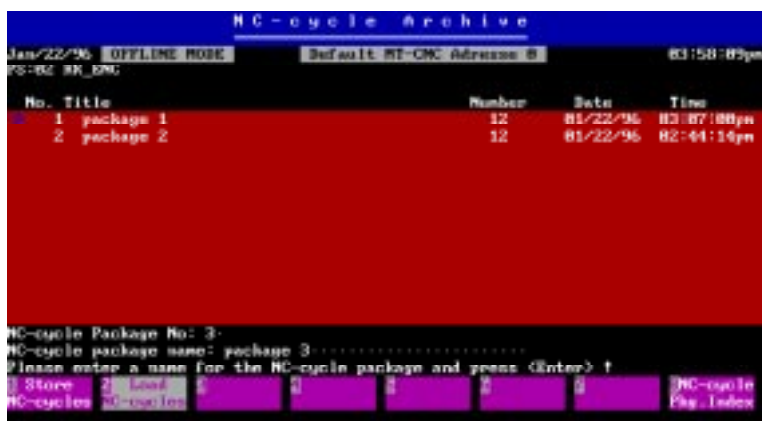


Picture 34 Store NC-cycle package

Pressing **F1** [Store NC-cycles] opens a file selection window, that is splitted in two parts. In the upper window the filename of the NC-cycle package to be output can be written (drive:\path\filename). In the lower window drive- and path selection can be done using cursor and **Enter**.

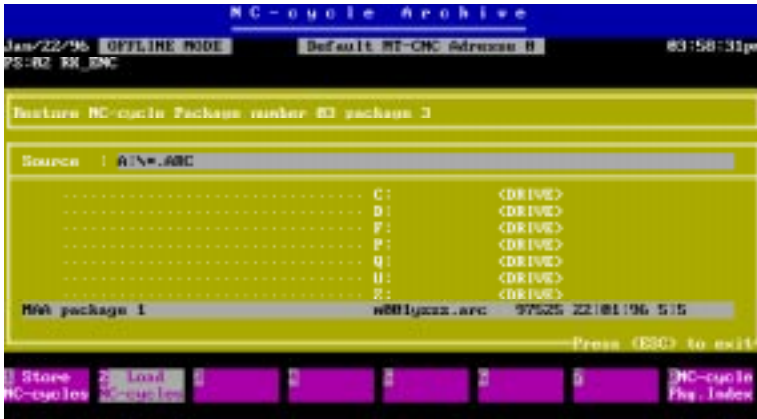
Pressing the **Tab** key toggles between the two windows. **Enter** starts storing.

4.13.2 Load NC-cycle package



Picture 35 Load NC-cycle package

After pressing **F2** [Load NC-cycle] the system asks for an unused index number in the range of 1 to 99.



Picture 36 Load NC-cycle package

Enter opens a file selection window, that is splitted in two parts. In the upper window the filename of the file to be read can be input (drive:\path\filename). In the lower window drive-, path- and file selection can be done using cursor and **Enter**.

Pressing the **Tab** key toggles between the two windows.

4.14 Retransmit NC-cycle package


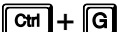









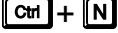


By pressing **Ctrl** + **F8** [MT-CNC => Cycle-Pg] the NC-cycle package stored in the NC-memory can be read and stored in the NC-cycle package index. The system asks for an unused index number in the range of 1 to 99. **Enter** starts retransmission. Comments of the NC-code are not retransmitted

5 Editor











5.1 Cursor movements

Cursor movements	Key sequence	Key sequence
moves cursor one character to the left		+
moves cursor one character to the right		+
moves cursor one word to the left; cursor is positioned at the begin of the previous line if cursor is at the end of the line	+	+
moves cursor one word to the right; cursor is positioned at the begin of the next line if cursor is at the end of the line	+	+
position cursor at the begin of the line		+
position cursor at the end of the line		+
position cursor one line up		+
position cursor one line down		+
scroll display one line up	+	
scroll display one line down	+	
scroll display one page up		+
scroll display one page down		+
position cursor at the begin of the editor window	+	+
position cursor at the end of the editor window	+	+
position cursor at the begin of the file	+	+
position cursor at the end of the file	+	+
expects the entry of a line number and positions the cursor on the specified line; the cursor is positioned to the last line if the number is greater than the number of available lines	+	
expects the entry of a line number and positions the cursor on the specified line; a beep signal is generated if the number is greater than the number of available lines, and the cursor stays at the current position	+	

5.1.1 Insert and delete

Insert and delete	Key (s)
Deletes the character at the cursor position	 
Deletes the character to the left of the cursor position If the cursor is at the beginning of a line, the line will be appended to the previous one.	<Bksp>   <Bksp>
Deletes the line at the cursor position	
Deletes from cursor position to the end of line	 
Deletes the word to the right of the cursor position If the cursor is at the end of a line, the line will be appended to the following one.	
New line	 
Inserts a new line at the cursor position	 
Moves the cursor to the next tabstop If the insert mode is activ, the text right to the cursor will be moved to the next tabstop. If 'hard' tapstops are selected, the distance will be 8 columns. If 'soft' tabstops are selected (standard), the tabstops are determined by the position of the words of the first line. The first character of a word represents a tabstop.	 

5.1.2 File commandos

File commands	Taste (n)
Save file without exiting editor	 
Abort editor without saving the file	 
Save and exit editor	   
Save and exit editor	
Save file, exit editor and return to MUI main menu	

5.1.3 Block commands

Block commands	Key(s)
Mark the beginning of the text block	Ctrl + K B
Mark the end of the text block	Ctrl + K K
Mark the word at the cursor position as a block	Ctrl + K T
Jump to the beginning of a marked block	Ctrl + Q B
Jump to the end of a marked block	Ctrl + Q K
Hide / display the marked block Block commands will not execute or generate an error, if a marked block is hidden	Ctrl + K H
Copy marked block to current cursor position	Ctrl + K C
Move marked block to current cursor position	Ctrl + K V
Delete the marked block	Ctrl + K Y
Shift marked block one character to the right	Ctrl + K I
Shift marked block one character to the left	Ctrl + K U
Switch upper case to lower case and lower case to upper case letters	Ctrl + O O
All letters in upper case	Ctrl + O U
All letters in lower case	Ctrl + O V
Read file from disk and insert it at the cursor position as a text block	Ctrl + K R
Write the marked block as a file to the disk	Ctrl + K W
Find entry	Ctrl + Q F
Find entry 1 and replace it with entry 2	Ctrl + Q A
Find next location of entry	Ctrl + L

5.1.4 Text marking

Text marking	Key(s)
Put one out of 4 marked texts to the cursor position Ctrl + K 0 put marked text '0', Ctrl + K 1 put marked text '1', etc.	Ctrl + K 0 Ctrl + K 3
Move cursor to a marked text Ctrl + Q 0 move to marked text '0' Ctrl + Q 1 move to marked text '1'	Ctrl + Q 0 Ctrl + Q 3
Switch between marked text	Ctrl + K M
Jump to previous cursor position	Ctrl + Q P

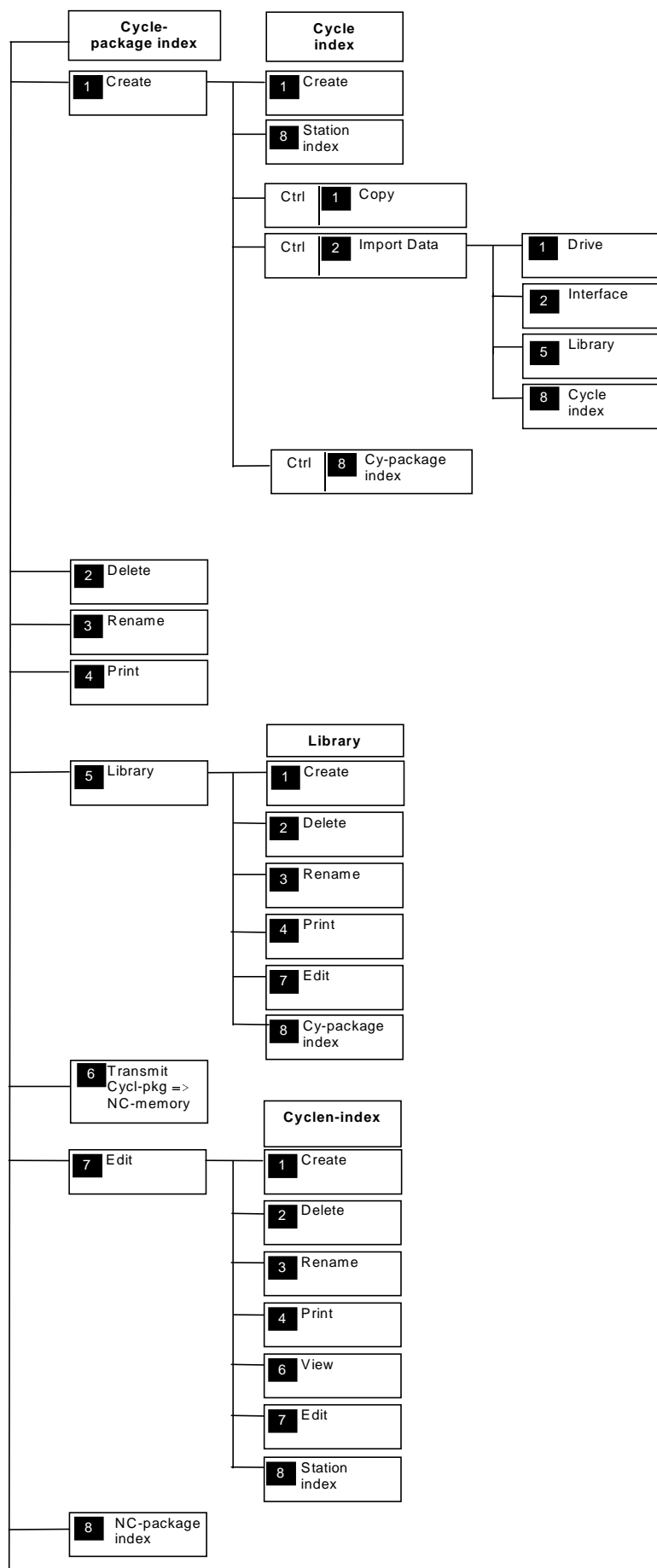
5.1.5 Text format

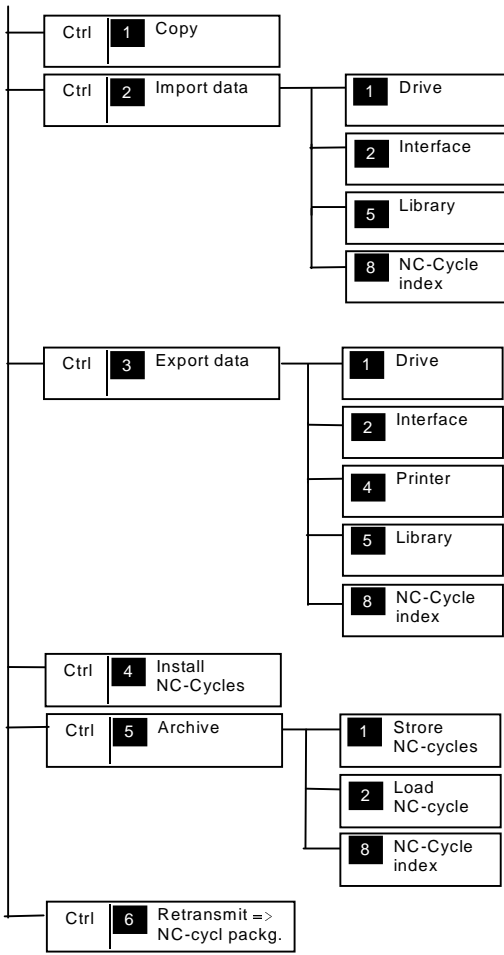
Text format	Key(s)
Switch between 'Insert' and 'Overwrite'	Insert Ctrl + V
Switch automatic indentation On/Off	Ctrl + O I
Switch automatic word wrap On/Off	Ctrl + O W
Switch between hard and soft tabulator	Ctrl + O F
Input number of columns between tabstops (1-10)	Ctrl + O T

5.1.6 Other key combination

Other key combination	Key(s)
Undelete last line modification	Ctrl + Q L
Switch NC-block display On/Off	Ctrl + J T

6 Menu- and Softkey-Structur





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