

Description of Functions 09/2003 Edition

motion control

information system

NC Program Management DNC Machine
SINUMERIK 840D/840Di/810D

SIEMENS

SIEMENS

Motion Control Information System

SINUMERIK 840D/840Di/810D NC Program Management DNC Machine

Description of Functions

Valid for

Motion Control Information System DNC Machine Software Version 1

09.03 Edition

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SINUMERIK® Documentation

Printing history

Brief details of this edition and previous editions are listed below.

The status of each edition is indicated by the code in the "Remarks" column.

Status code in the "Remarks" column:

- A** New documentation.
- B** Unrevised reprint with new Order No.
- C** Revised edition with new status.

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This book is part of the documentation available on the CD-ROM (**DOCONCD**)

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Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

We have checked that the contents of this document correspond to the hardware and software described. Nonetheless, differences might exist and we cannot therefore guarantee that they are completely identical. The information contained in this document is, however, reviewed regularly and any necessary changes will be included in the next edition. We welcome suggestions for improvement.

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1 Introduction

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1.1 MCIS for machine tools

DNC is a software module of the system family Motion Control Information System (MCIS) of SIEMENS.

MCIS provides modular software solutions for integrating CNC and machine tools in a production line. This allows you to integrate modern SINUMERIK 810D/840Di/840D controls and older CNC and machine tools that are not equipped with an open network interface in an interconnected automation system. MCIS is therefore the key to greater productivity in your production processes.

MCIS consists of several function modules

1. Production data management
 - **MDA (Machine Data Acquisition)**
 - **PDA (Production Data Acquisition)**
 - **PMT (Parts Monitoring & Tracking)**

For better transparency in manufacturing and to improve production processes

2. NC program management
DNC (Direct Numeric Control):

For reducing costs in NC data organization with user-friendly NC program management and parameterization of CNC controls, and fast NC program parameterization of the SINUMERIK 810D/840D/840Di Ethernet network

3. Tool management
TDI (Tool Data Information):

To reduce tool inventory in circulation and machine downtimes

4. Maintenance management
TPM (Total Productive Maintenance)

To support the machine operator with maintenance tasks on the machine and plants.

5. Service management
RCS (Remote Control System)

Remote diagnostics for reducing machine idle times with fast notification if a fault occurs and simple online diagnostics via modem, ISDN, Intranet, Internet, and DSL.

1.2 NC program management



Fig. 1-1 NC program management DNC

NC program management DNC supports handling of NC programs and helps to reduce costs in the organization of NC data.

With this easy to use electronic NC program management and archiving system, NC programs can be accessed by all the machines in the production line. This is of particular relevance to production lines with a high degree of flexibility, product variety, and NC data that often change. For example, in machining centers, on special-purpose machines, and flexible production lines.

NC product management DNC consists of software modules that depending on the requirements of the function can be implemented to different degrees.

- **DNC Machine**
is the software module for SINUMERIK 810D/840Di/840D for transferring NC programs between SINUMERIK and an NC programming workstation (via network file system)
- **DNC Cell**
is the software module for standalone systems for DNC networking of a small manufacturing area
- **DNC Plant**
is the software module for multi-user systems for a factory-wide DNC networking

1.3 Using a DNC machine

With the software **DNC Machine**, Siemens controls SINUMERIK 810D/840Di/840D can be connected to a file system via a standard Ethernet network. This is used, for example, to transfer NC programs between the NC programming system and the CNC machine.

From a local MMC/PCU system, the machine operator can request or upload to the network file system, NC data located in any network directory, for example on an NC programming system.

The file information used in the WINDOWS standard such as file name or NC data name, file length, and storage date are also held in **MMC/PCU data management**.

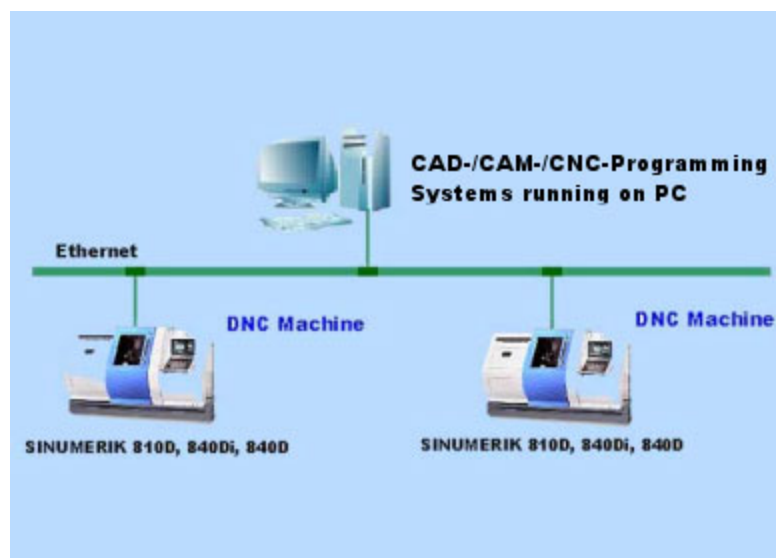


Fig. 1-2 SINUMERIK with **DNC Machine** link to a network file system



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2 System Requirements of SINUMERIK

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2.1 Hardware

DNC Machine runs on SINUMERIK 810D/840D/840Di with the following hardware:

- **PCU 50/70 with OP 010 /012 /015**
- **MMC103 with OP 031 /032**
additionally:
 - PCI/ISA adapter
 - Ethernet network interface

2.2 Software

The following **SINUMERIK**-software is required for **DNC Machine**:

- HMI software as from software version 6
under **Windows NT** on PCU 50/70
- **MMC** software, software version 4.04.17 or higher
under **Windows 95** on MMC 103
- If connected to a UNIX file system network software must be installed on the SINUMERIK e.g. NetManage InterDrive for Windows. As an alternative, e.g. the freeware software "Samba" can be used on the server. In that case, no additional software is required on the SINUMERIK.



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3 User Interface

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The user interface of **DNC Machine** has the look and feel of the Windows Explorer and provides the functions of the SINUMERIK operator panels. **DNC Machine** is integrated in **SINUMERIK HMI** and can be called up with function key **DNC**.

3.1 User interface of DNC Machine on the SINUMERIK

The following basic user interface is available:

- **Management file system**
for displaying existing NC programs in the file system and for transferring NC data to the **SINUMERIK**
- **Data management MMC/PCU**
for displaying existing NC programs in the **SINUMERIK** data management and transferring the NC data back to the **file system**
- **Setting parameters**
for adapting the most important settings of
- **User management**
for changing the password and for user administration
- **Log book**
for displaying NC program uploads, for example, and various system messages
- **Filter**
for selecting and changing the NC data filter in the file system

3.2 Structure of the user interface

3.2.1 General

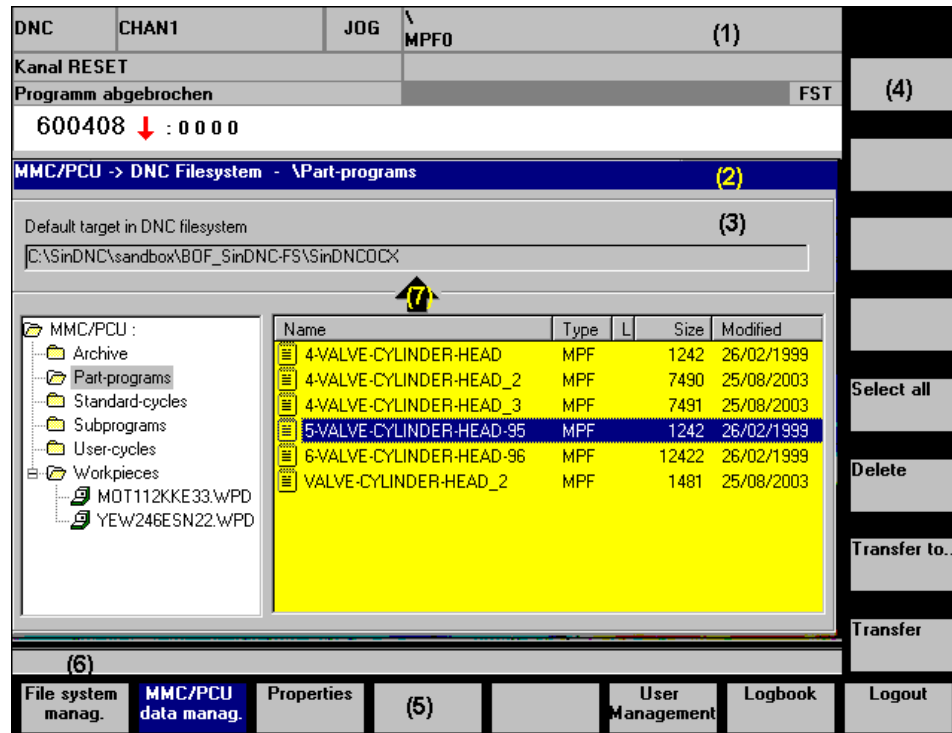


Fig. 3-1 User interface DNC Machine

Structure

The screenforms of **DNC Machine** are divided into the following areas:

- (1) Header **SINUMERIK HMI**
- (2) Title line
- (3) Screenform content **DNC Machine**
- (4) Vertical soft keys
- (5) Horizontal soft keys
- (6) Message line
- (7) Direction of upload

Header (1)

The header is part of the SINUMERIK HMI. The most important machine states, the numerical control status and the alarms of the alarm server are displayed here.

Title line (2)

The title of the screen window is displayed in the title line. This is also where the NC data storage structure of the machine in the network directory or is displayed.

Screenform content of DNC Machine (3)

The content consists of a destination and target area. The **DNC** data management is always displayed in the upper part of the screenform; depending on the screenform this is either the destination or the source.

DNC Machine provides two views of the NC data in the system:

- File system management
- MMC/PCU data management

You can upload the NC programs you have selected with the softkeys.

You can also select other functions with the softkeys:

- Setting parameters
- User management
- Log book
- Login

Transfer arrow (7)

A directional arrow is shown at the interface between the upper and lower screen areas to indicate the direction of transfer for the transmission of NC data.

3.2.2 Updating the NC data display

The NC programmer can insert new NC programs in the network directly while the system is in operation. So that these changes are also displayed in **DNC Machine** the display is updated:

- automatically when **DNC Machine** is switched to the foreground
- cyclically if this has been configured in the settings.

3.3 Online Help

Operator support of the **DNC Machine** software is available by pressing the Info key to access the Online Help. The Online Help provides information about the screenform that is currently open.

3.4 Languages

If the language on the control is changed **DNC Machine** automatically adapts to the new language, as long as the language is available for **DNC Machine**. **DNC Machine** is supplied in the following languages: English, French, German, Italian, and Spanish.



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4 Functions

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4.1 Overview of functions

With **DNC Machine** NC data are downloaded from a network directory into SINUMERIK data management (MMC 103 or PCU 50/70) or uploaded from SINUMERIK to a network directory (network file system), on the MMC/PCU operator panel.

Functions

- Overview of NC data/programs that are available for SINUMERIK in a network directory
- Set transmission or free navigation to a network directory
- Filtering by means of the displayed NC data/programs in the network directory
- Selection and download of single or several NC data files (NC programs, workpieces etc.) to SINUMERIK
- Default or target directory selection on SINUMERIK
- Selecting and deleting NC data in the network file system
- Overview of NC data/programs located on SINUMERIK (workpieces, main programs, subroutines, cycles, etc. – all the data of the SINUMERIK data management server)
- Selection and upload of single or several NC data items (NC programs and workpieces etc.) to the network file system
- Automatic NC program upload
- Default or target directory selection in the network
- Selecting and deleting NC data on SINUMERIK
- Password-dependent user interface for system settings
- Authorization concept can be controlled with user management
- Logbook of uploaded files and important events
- Language versions English, French, German, Italian and Spanish

4.2 NC data upload from network file system to SINUMERIK

4.2.1 Network directory view of NC data for SINUMERIK

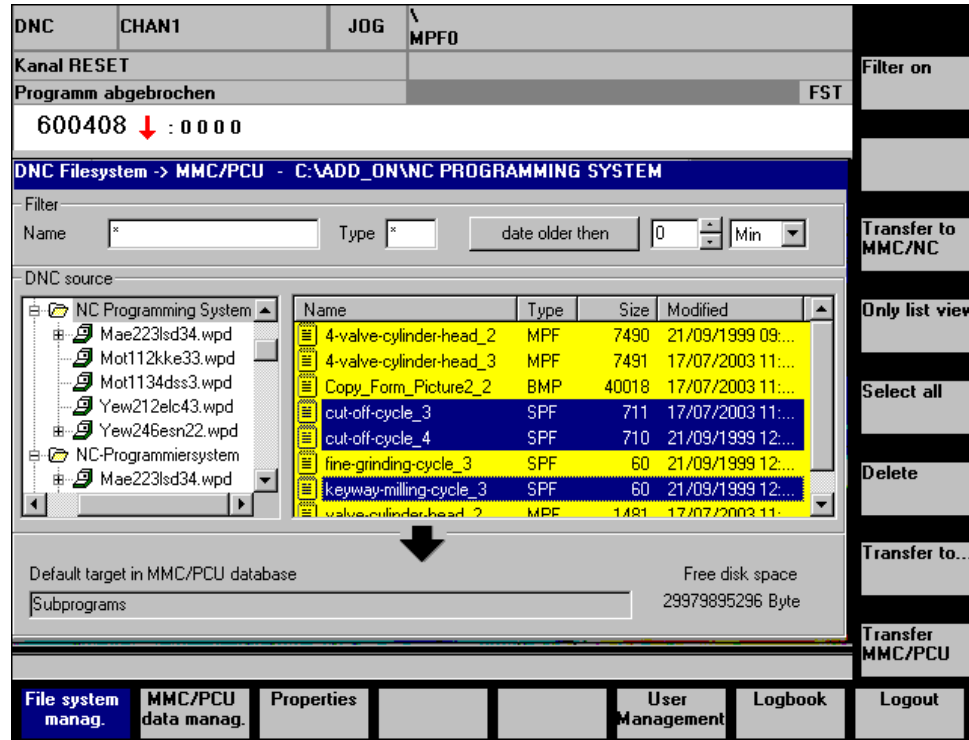


Fig. 4-1 File system management

The left-hand part of the screen shows the directory tree of the file system and allows you to navigate within the directories permitted by the parameter assignment. The NC programs available in a particular directory are displayed on the right-hand side. The file types shown might be restricted by parameterization. You can activate a filter line at the top of the screenform for an even more restrictive selection of NC programs and files.

The copy destination in the control is shown in the lower part of the screen. The mid-screen arrow indicates the direction of copying. A copy destination in the control is proposed automatically in accordance with the file type selected.

4.2.2 NC data download to SINUMERIK with default destination

Before you can upload NC data you must select one or several files in the NC program list.

Activating the filter, deactivating the filter

The NC program list displayed is influenced by the filter conditions. You can restrict the selection of visible NC programs here.

Select all

The **Select all** function key is used to select or deselect all the entries in the program list. File types are not taken into account.

Note

If more than one NC file is selected they must all be of the same type. NC files in workpiece directories are the exception. In workpiece directories, you can mix different file types in the selection.

Download with default destination

The relevant default destination (parts programs, subroutines) will be preset on SINUMERIK to correspond to the selected NC data file type (.MPF, .SPF) in the network directory. Select the **Transfer** function key to download the NC data to the relevant SINUMERIK directories.

MMC or NC transfer destination

With this function key you can toggle between the SINUMERIK transfer destination control (MMC/PCU) and NC (NCU). The transfer destination currently active is indicated by the function key **Transfer**. Its text is supplemented by the currently active transfer destination.

Delete

Use the **Delete** function key to delete all the selected files.

Show play list only

If the parameterization does not allow you to navigate in the directory tree, you can hide the directory tree with function key **Only list view**. The NC data list is now displayed across the entire screenform.

The directory tree can be shown again with the same function key, which is now labeled **Show directory**.

4.2.3 NC data download to SINUMERIK with free choice of destination

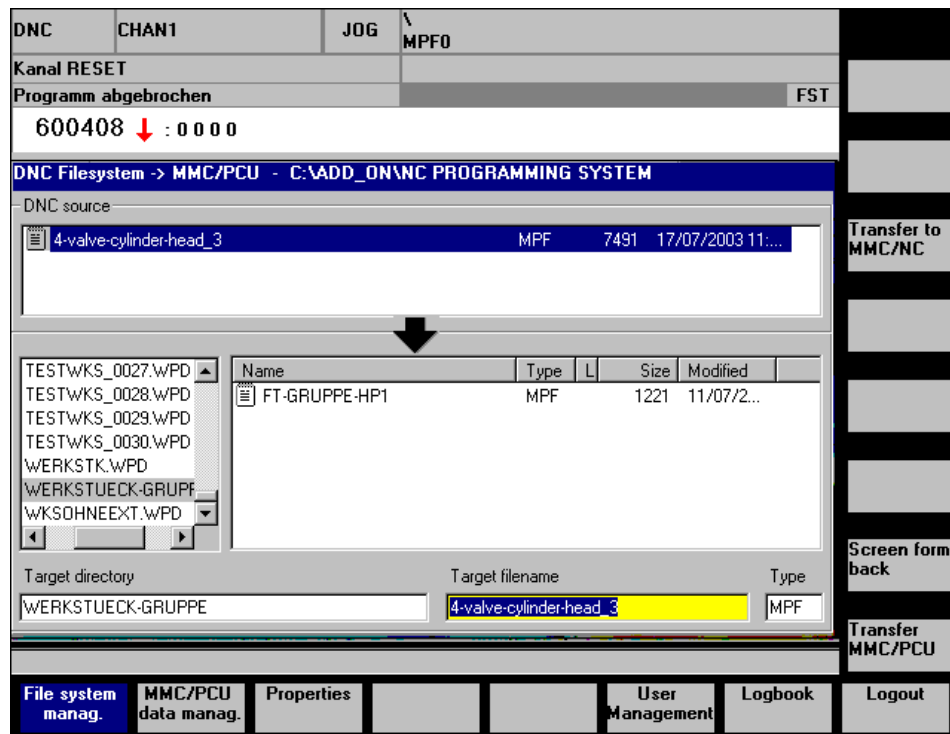


Fig. 4-2 File system management with free choice of destination

Download with free choice of destination

If the NC data are to be downloaded to a specific directory other than the default directory (e.g. tool directory or user-specific directory in SINUMERIK data management), this can be defined explicitly with the function **Transfer to....**

In the **File system management** screen, select the required destination for transferring the NC data. It is possible to change the directory by navigating in the directory tree. With workpieces, you can adapt the name of the workpiece as a target directory. The file name and type of the target file is only available for modification if a single NC program is being transferred.

Operating screen

The upper part of the screen shows the previously selected NC data files of the DNC file system. In the lower part, you can navigate in MMC/PCU data management. The critical fields are **Target directory**, **Target file name**, and **Type**. These fields define the transfer destination on the MMC/PCU.

Every selection that you make in the directory tree or in the file list is automatically transferred to the target fields.

4.2.4 NC data download to NCU

The function **Transfer to NCU** can be activated by configuring the properties.

In this way the operator can download NC programs from the file system to the control (MMC/PCU) or to the NC (NCU).

4.2.5 Filter

The function key **Activate filter/Deactivate filter** is used to display or hide the line with the filter conditions. The filter conditions affect the NC program list currently displayed. The last filter condition to be entered remains active even when you hide the filter or change the screenform.

4.3 NC data upload to network file system

On the SINUMERIK, the operator can upload NC data such as main programs, subroutines, workpieces, cycles and any other data that are stored on the data management server to the network file system.

4.3.1 View of NC data in MMC/PCU data management

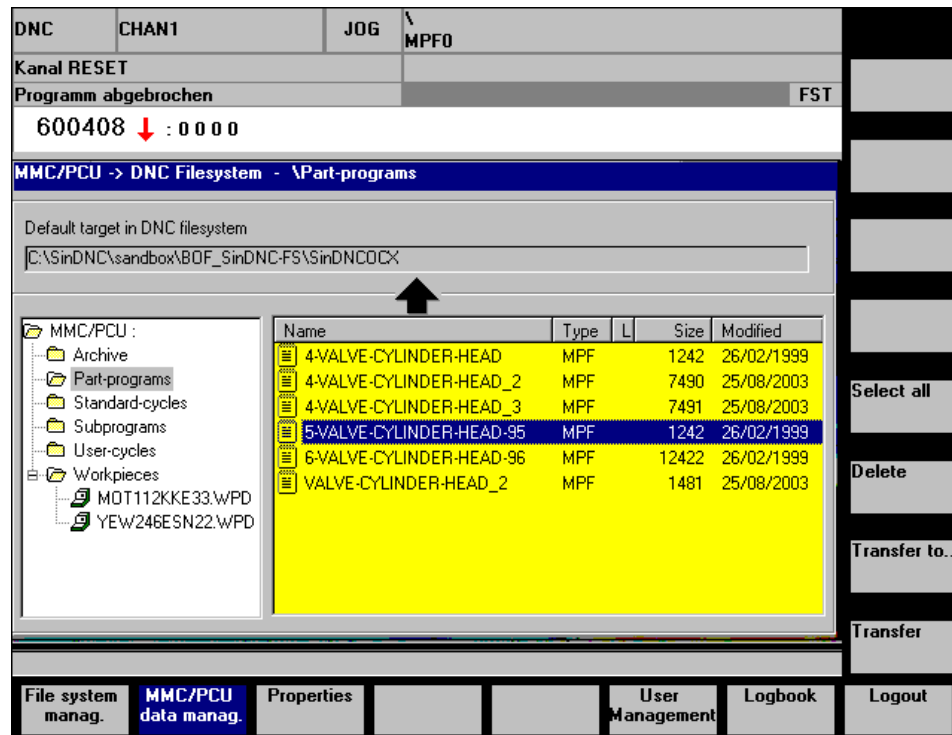


Fig. 4-3 Data management MMC/PCU

The transfer destination in the file system is shown in the upper part of the screen. The destination is automatically suggested and defined in the properties. In the lower part of the screen you can navigate in the directory tree of the MMC/PCU data management and select one or several files. The mid-screen arrow indicates the transfer direction.

4.3.2 NC data upload to network file system with default destination

You can define the extent of NC data to be viewed and uploaded in the properties. In the properties you also define the default destination in the DNC file system.

One or more files can be selected from the NC data list.

Select all

The **Select all** function key is used to select or deselect all the entries in the NC data list. File types are not taken into consideration here.

Download

The selected NC files are downloaded with function key **Download** to the default network directory.

Delete

Use the **Delete** function key to delete all the selected files.

4.3.3 NC data upload to network file system with free choice of destination

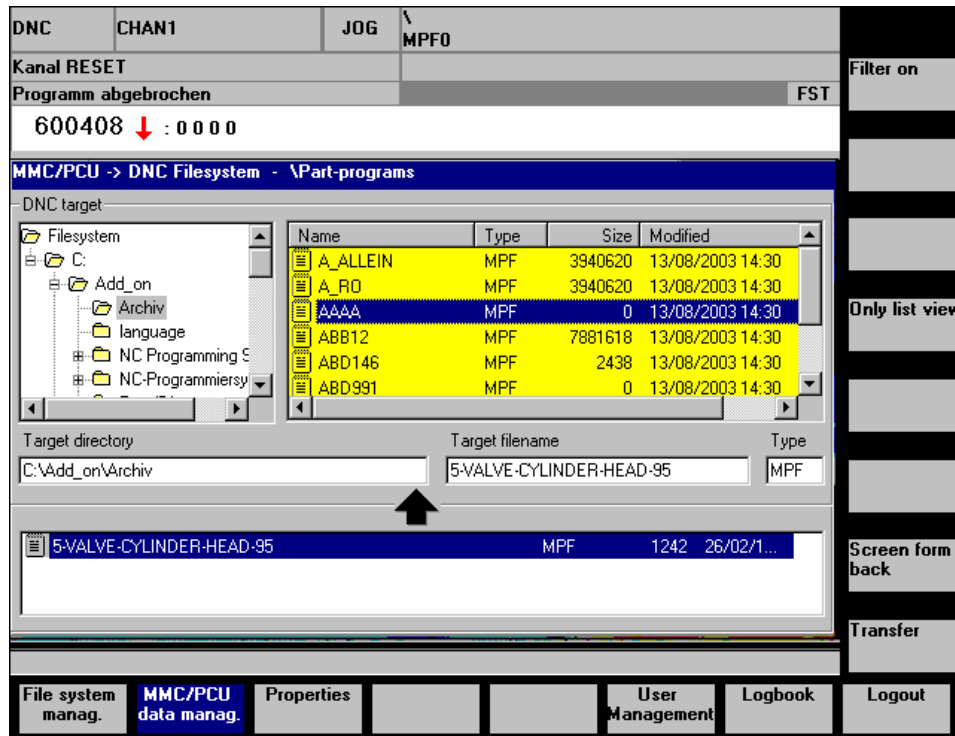


Fig. 4-4 DNC Machine: MMC/PCU data management with free choice of destination

If the NC data are to be downloaded to another directory tree in the network file system (e.g. when a particular NC program is to be stored in a defined workpiece directory), this can be defined explicitly with the function **Transfer to...**

You can select any destination to which you want to download the NC data in the upper part of the screenform. It is possible to change the directory by navigating in the directory tree. Any target directory can be assigned. If the directory does not yet exist it is created automatically. The file name and type of the target file is only available for modification if a single NC program is being transferred.

Operating screen

The lower part of the screen shows the previously selected files in MMC/PCU data management. In the upper part, you can navigate in file system management. The critical fields are **Target directory**, **Target file name**, and **Type**. These fields define the transfer destination in the DNC file system.

Every selection made in the directory tree or in the file system NC data list is automatically transferred to the target fields.

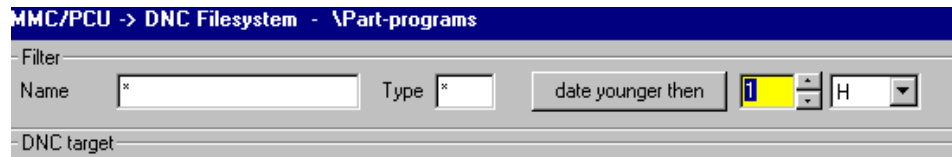


Fig. 4-5 **DNC Machine:** Filter line

The selection in the NC data list can be restricted by means of a filter. The filter line can be displayed via the function key **Filter on**. The appropriate filter can then be selected.

4.4 Automatic NC program transfer

Automatic NC program transfer means that NC programs, NC data, and workpiece directories are transferred from the file system to the control cyclically and in the background.

You must define your own directory for automatic program import. The directory must only contain files that are to be transferred automatically. This read directory is defined in the **Properties 2** screenform.

In screenform **Properties 2** you also specify the cycle time for automatic import. Make sure you do not select a time interval that is too short because you cannot perform operations on the DNC machine user interface while automatic import is active. Automatic import is only performed if the defined time interval is greater than zero.

The download destination is the default directory of the file in question or, in the case of workpieces, the workpiece directory. If you always work with "Internal path" (see screenform **Properties 1**) this is also taken into account with automatic program import.

After successful downloading the original file is immediately deleted. If downloading has not been successful, the extension .ERR is appended to the file name plus its extension. A workpiece directory is given the extension .ERR if at least one of the files has not been downloaded successfully. If an error occurs while a file is downloaded, downloading is continued with the next file. Files with the extension .ERR are ignored on the next download.

Notice

- Because files are deleted and renamed in the directory when they are automatically downloaded, this directory must not contain any files or directories that may not be deleted.
 - Because this process includes deleting and renaming, write access must be enabled for the directory and files.
 - Automatic program import can only be executed when the user interface of DNC Machine is started. If automatic import is always to be performed, DNC Machine must be started up when the control is booted.
-

4.5 System settings

4.5.1 Properties 1

The **Properties 1** and **Properties 2** screenforms are where you adapt the most important parameters for the user interface DNC Machine.

Table 4-1 System settings, Properties 1

System settings	Explanation	Parameter
Read path in the DNC file system	Paths shown when the screenform File system management is displayed for the first time. As many as four path names can be specified in succession, separated by a semicolon. The default path is the first path name specified.	Absolute path name, e.g. f:\nc\read or UNC notation: <u>\\servername\nc\read</u> or "-" for the application path
Write path in the DNC file system	Destination paths of the MMC/PCU data management screen. As many as four path names can be specified in succession, separated by a semicolon. The default path for the upload is the first path specified.	Absolute path name, e.g. f:\nc\write or UNC notation: <u>\\servername\nc\write</u> or "-" for the application path
Legal MMC directories	Only legal MMC/PCU directories are displayed in the MMC/PCU data management directory structure.	Any number of MMC directory short forms separated by commas, e.g. "ARC, CST, DEF, MPF, SPF, WCS"
Legal DNC extensions	In the file system view only files with the file extensions defined here are displayed.	Any number of file extensions separated by commas, e.g. "TXT, ARC, MPF, SPF, WCS" or a blank field for all file types.
Overwriting in MMC possible	Can files in the MMC/PCU data management be overwritten?	0 - No 1 - Yes
You are allowed to change the read path	Can the operator navigate outside the read path in the DNC file system ? (You are always allowed to navigate in the subdirectories.)	0 - No 1 - Yes
Overwriting in DNC possible	Can files be overwritten in the file system management?	0 - No 1 - Yes
You are allowed to change the write path	Can the operator navigate outside the write path in the DNC file system ? (You are always allowed to navigate in the subdirectories.)	0 - No 1 - Yes
End of line in the file system	If "1 - LF", CR is eliminated from every line that is transferred by the MMC/PCU to the file system and added to each line that is loaded into the MMC/PCU.	0 - CRLF 1 - LF

System settings	Explanation	Parameter
Internal path	Structured NC programs contain the MMC/PCU path name in program code. Should this internal path name be used? (Operator input relating to the destination in MMC/PCU is then irrelevant)	0 - Internal paths not taken into consideration 1 - Max. one internal path at the start of the file taken into consideration. 2 - All internal paths taken into consideration
Conversion of a DNC type to an MMC type and MMC default directory	Only certain file types are permitted in MMC/PCU data management. This table allows automatic conversion of any file type of the DNC file system to a data type of the MMC/PCU file management. You must also specify which MMC/PCU data management directory is to be used as the default for saving files.	Example: TXT, MPF, MPF The DNC file type TXT is converted to the MMC/PCU data type MPF and saved in MMC/PCU data management in the main program directory MPF.DIR.

Setup screen for Properties 1

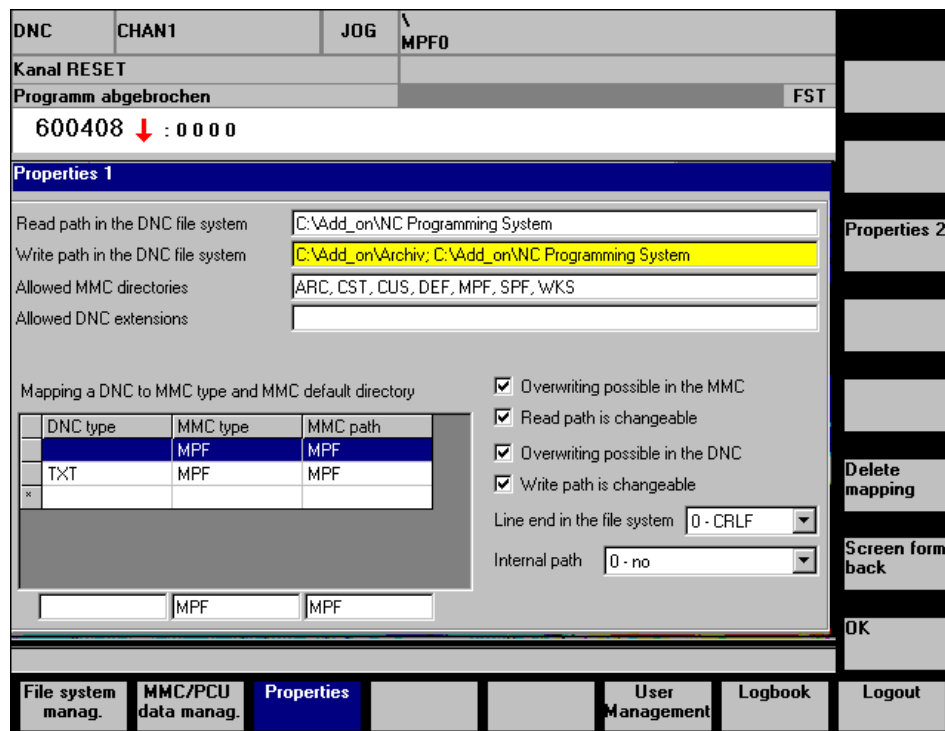


Fig. 4-6 Screenform Properties 1

4.5.2 Properties 2

You can adapt the most important parameters for the DNC Machine user interface in screenforms **Properties 1** and **Properties 2**.

Table 4-2 System settings, Properties 2

System settings	Explanation	Parameter
Upload to the NCU is enabled	Are you always allowed to upload data to the NCU? Only if uploading to the NCU is enabled is the File system management screen toggle button Upload Target MMC/NC in screenform File system management displayed and upload variants Upload MMC/PCU and Upload NCU possible.	0 - No 1 - Yes
Default time for manual upload and automatic import	In the case of automatic import, all the data at the transfer location specified here are uploaded. In the case of manual import, this specifies the default for the transfer location. This always applies whenever the user is not allowed to change the transfer location. Otherwise the operator can specify the transfer destination with a button in the File system management screen.	0 - MMC/PCU 1 - NCU
The user is allowed to change the transfer location	If the user is allowed to change the transfer location, an additional button appears in the File system management screen to enable the user to toggle between MMC/PCU and NCU.	0 - No 1 - Yes
NCU name	The NCU name is the NCDDE name of the NCU. The NCU name need only be specified if there are a number of NCUs available in the control. If no entry is made here, the default NCU is taken as the destination of the transfer to the NCU.	A typical default NCU name is Ncu840d
Read path for autom. import	All files from this directory are automatically transferred to the MMC/PCU or to the NCU. The uploaded files are deleted or renamed if an error occurs during the transfer. <u>NOTICE:</u> Make sure that the directory does not contain any data that must not be deleted or renamed!	Absolute path name, e.g. f:\nc\read\autom
Interval for autom. import	Automatic import is run cyclically, at the specified time interval. The time unit is in minutes.	0 - No automatic upload Any max. 8-digit integer value in mins.

System settings	Explanation	Parameter
Refresh cycle	This is how often the data in the File system management and MMC/PCU data manag. screens is updated. The time unit is in seconds.	0 - No refresh integer value between 1 and 65 seconds.
Trace level	If trace is activated, internal program information is written to a circulating buffer with 3 trace files. <u>NOTICE:</u> This slows down the program run.	0 - No trace 1 - Minimal trace 3 - Maximum trace
Default language	Language in which the user interface appears the first time it is displayed. <u>NOTICE:</u> The default language is only active if a language has not been explicitly specified in the MMC/PCU.	The default language on delivery is English
Length of log file	The size of the log file is limited to 64 kBytes for technical reasons. The log messages are recorded in a circulating buffer of 10 files	500 - 65535 bytes

Setup screen for Properties 2

DNC CHAN1 JOG \ MPFO

Kanal RESET

Programm abgebrochen FST

600408 ↓ : 0 0 0 0

Properties 2

DNC Machine Version Version 1.0.0 - 25.08.2003

Transfer to the NCU is enabled

Default target for manual transfer and automatic import 0 - MMC/PCU User can change manual transfer target

NCU name -

Read path for autom. Import C:\tmp\autoimport

Interval for autom.import 0 Minutes

Refresh cycle 30 Seconds

Trace level 0

Default language English

Logbook file length 60000 Bytes

Properties 1

Screen form back

OK

File system manag. MMC/PCU data manag. Properties User Management Logbook Logout

Fig. 4-7 Screenform Properties 2

4.6 Authorization concept

4.6.1 Logging on

With **DNC Machine** a user must be logged on before he or she can work on the user interface. This is done in one of the following ways

Automatic logon

When **DNC Machine** is started, the current protection level of the control is ascertained and an automatic logon generated from that, i.e. the rights of the user assigned to this protection level are used.

Manual logon

Any user can log on with his or her rights in the logon screenform. Manual logon always takes priority over automatic logon.

Manual logon is deactivated as soon as the user logs off.

If manual logon is to be used exclusively, automatic logon must be disabled for all users.

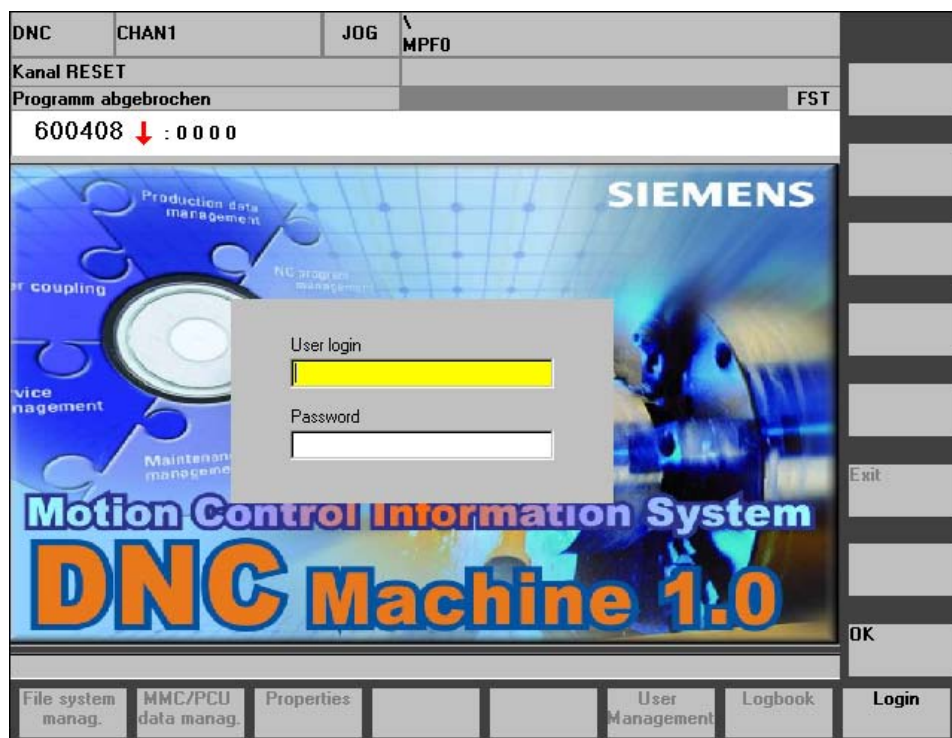


Fig. 4-8 Entering the password

4.6.2 Changing the password

Depending on the rights of the current user a screenform of varying appearance appears when the function key User management is activated. A user with administration rights can manage all users in this screenform. For all other users this form is only available for changing their password.

The screenshot displays a control panel interface. At the top, there are status indicators: 'DNC', 'CHAN1', 'JOG', and 'MPPFO'. Below this, a message reads 'Kanal RESET' and 'Programm abgebrochen' with a red arrow pointing down and 'FST'. A numerical display shows '600408' followed by a red arrow and ': 0 0 0 0'. The main area is titled 'User Management' and contains the following fields:

- User login:
- Password:
- New Password:
- Reentry Password:

On the right side, there is a vertical column of buttons: 'new user', 'Change user', 'Delete user', 'Cancel', and 'OK'. At the bottom, a menu bar includes 'File system manag.', 'MMC/PCU data manag.', 'Properties', 'User Management' (highlighted in blue), 'Logbook', and 'Logout'.

Fig. 4-9 Changing the password

4.6.3 User management

Users are added, deleted, disabled, or changed in the screenform User management. User rights are also assigned in this screenform.

Notice

Changes do not take effect until the next time the user is changed, i.e. by logging on manually or changing the protection levels of the control.

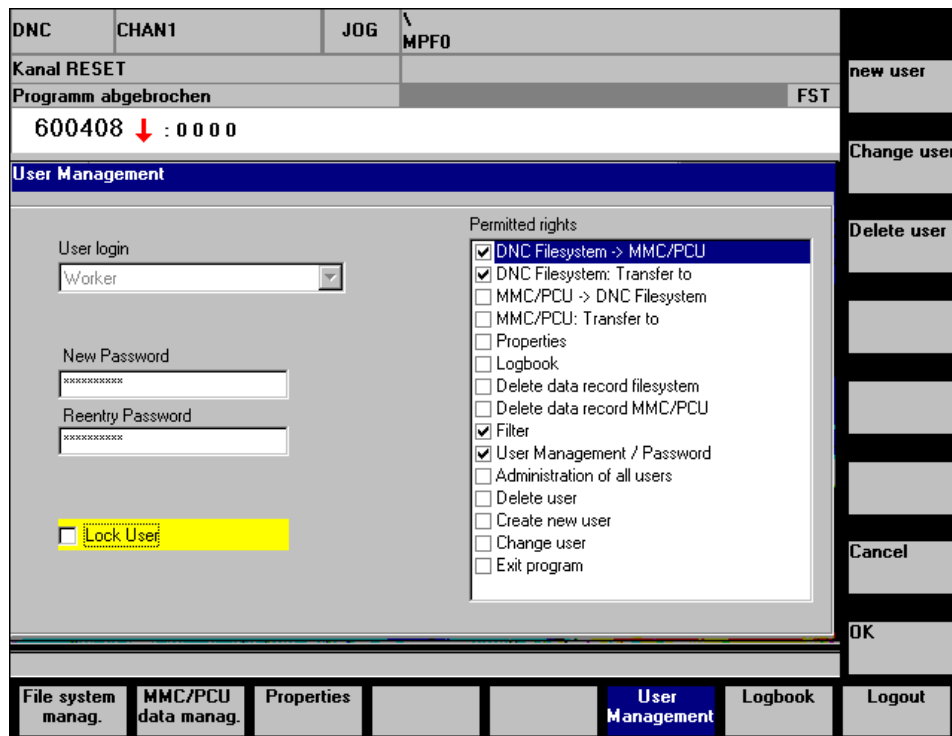


Fig. 4-10 User management

Some users may not be deleted at all. These are the administrator and the users who represent the eight protection levels of the control. The administrator cannot be disabled and always has all rights.

Protection level concept of SINUMERIK

The protection levels of the control depend on the keyswitch position and assignment of a password. There are eight protection levels. Protection level 0 has the most rights, protection level 7, the least. On DNC Machine there is one non-deletable user for each protection level. Assignment is as follows:

Table 4-3 Assignment of protection levels, keyswitch position, and users

Protection level	Keyswitch position	Users in DNC Machine
Protection level 0	Password	HMISystem
Protection level 1	Password	HMIManufacturer
Protection level 2	Password	HMIService
Protection level 3	Password	HMIUser
Protection level 4	Keyswitch 3	HMIKeyPosition3
Protection level 5	Keyswitch 2	HMIKeyPosition2
Protection level 6	Keyswitch 1	HMIKeyPosition1
Protection level 7	Keyswitch 0	HMIKeyPosition0

4.7 Log book

The log book contains the most important events and messages together with the date, time, and user. That way, you can trace events, such as transmission, deletion, etc. and any errors that have occurred. The size of the log file can be set in Properties.

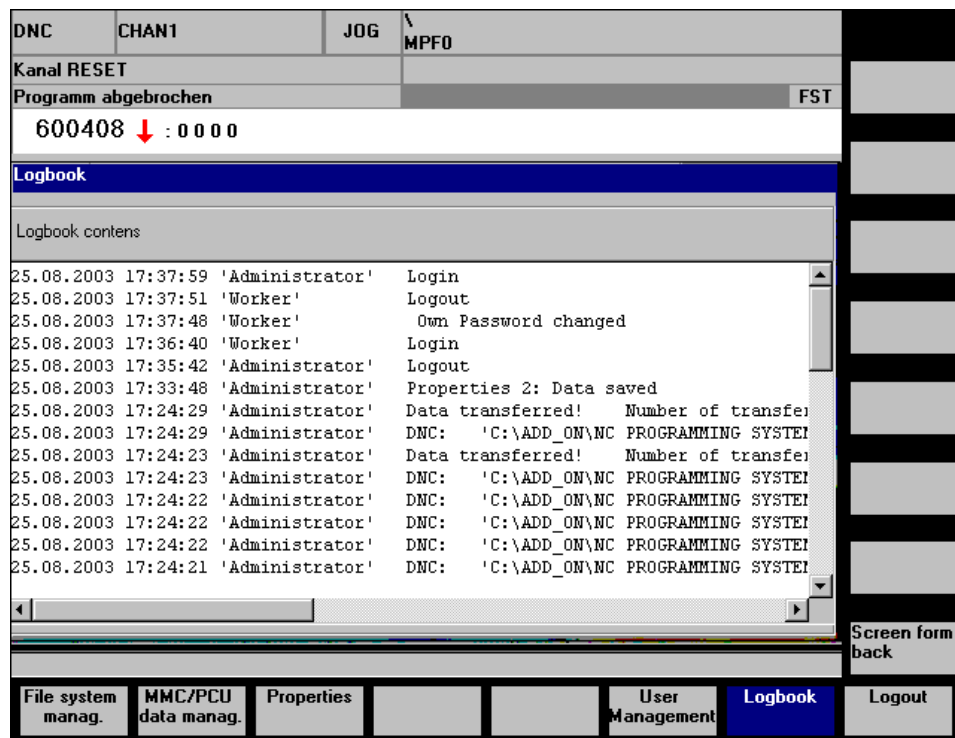


Fig. 4-11 Log book

A

A Appendix

A.1 DNC Glossary

Short form	Meaning
ASCII code	American Standard Code for Information 7-bit code
BMP	BitMaP Graphics file for clamping diagrams etc.
CNC	Computerized Numeric Control Numerical control with microprocessors
DNC	Direct Numeric Control System on which several CNC machines are linked by bidirectional data exchange to a central computer
DNC IFC SINUMERIK	Direct Numeric Control InterFace Client System on which several CNC machines are linked by bidirectional data exchange to a central computer. Data is transmitted via network to the SINUMERIK 840D.
EIA code	Electronic Industries Association 8-track punched-tape code in accordance with the ISO code, but with an even number of perforations per character
FTP	File Transfer Protocol
HMI	Human Machine Interface
ISO code	International Organization for Standardization 8-track punched-tape code
ISQL	Interactive Structured Query Language Allows interactive database access
MDA	Machine Data Acquisition Production data acquisition and evaluation on SINUMERIK 840D
MDA Machine SINUMERIK	Machine Data Acquisition Stand alone for SINUMERIK/PC incl. evaluation Machine data acquisition/production data acquisition
MMC	Men Machine Communication
MPF	MainProgramFile NC main program
OCX	OLE Custom Controls
OLE DB	Object Linking and Embedding DataBase Database access functions over OLE/COM

OLE/COM	Object Linking and Embedding/Component Object Model Object-oriented program model for defining object behavior, even beyond process limits
PCU	PC unit
SPF	SubProgramFile NC subroutine
SQL	Structured Query Language Database query language
SQL net	Structured Query Language Net Interface for database access via network
TCP/IP	Transmission Control Protocol/Internet Protocol Transfer protocol
TDI Machine	Tool Data Information Machine Information about availability and handling of tools.
TOA	ToolOffsetActiv Tool offsets
WPL	WorkPLan ASCII file for tool plans
ZOA	ZeroOffsetActive Zero offset

Notes

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