

Manual
MC5
Programming
Software

Order-No.:VIPA MC5-HB12E

Rev. 00/35

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A>TYPE README.TXT

To view the file under Windows® , please use the „NOTEPAD“; under OS/2® , please use „E“.

Manufacturer

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1. Introduction

1.1 Programming Software MC5

The Programming Software MC5 is a development tool to write, fast and easily, STEP[®]5-programs in STL or CSF for Siemens Programmable Controllers (PC's). The complete version of Programming Software MC5 covers STEP[®]5 functions offered by the Siemens programming terminal "PG685".

With the Programming Software STEP[®]5 from Siemens, programs can be developed on all IBM-AT or compatible computers that run under MS-DOS/PC-DOS. These files can be saved in ASCII-format on the hard disk or in any of the following formats: PG675, PG635, PG685 (see chapter 2 for system hardware requirements). Files created with these PG's can easily be edited using the Programming Software MC5.

The Programming Software version **2.xx** and higher does not run on IBM-XT personal computers or compatibles.

It should not be difficult for a PLC programmer to change over to MC5-Programming Software. An extensive help system may be called up from any place within the menu structure. A thorough knowledge of the MS-DOS/PC-DOS operating system is not required, but could be helpful. Some MS-DOS basic commands are described in chapter 1.3.

While working with the MC5-Programming Software, you will find that it is very user friendly. Some improvements, compared to the methods used up to now, are listed below:

- All Blocks of a STEP[®]5 program from Siemens (OB, PB, FB, FX, DB, DX, etc.) can be made available as ASCII-files on a DOS-diskette).
- There are extensive comment and documentation facilities i.e.: comment lines or longer explanatory texts can be added or inserted in between instruction lines (in PG-terms known as "Documentation Blocks").
- There can be up to 16 files at the same time in separate memory areas ready to work with and to copy any program part.
- Excellent editing facilities having several functions (such as: Search and/or Replace, Copy, Move, Delete, etc.) are available for program development.
- In order to explain separate functions, the User Configurable Help System may be called up at any time within the menu structure. Your own text may also be added.
- While editing, many additional functions can be activated, e.g. print the program, shell to MS-DOS command level and with a quick return to the edit functions.
- Colors on all screen items may be changed to meet individual taste or requirements.

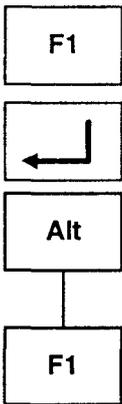
PLEASE NOTE:
A general knowledge of STEP[®]5 programming from SIEMENS is required when working with MC5-Programming Software. Training is available on request.

1.2 User's Manual for MC5-Programming Software

The User's Manual describes how to work with the MC5-Programming Software. In order to find easier certain parts of the text, the pages have been divided into three columns as follows:

Left column	Text part	Right column
Symbols Keywords	Text	Instructions Remarks

As an additional help for orientation, the current chapter number is printed on every page.



Explanation of Symbols used:

Symbol for the F1 key, meaning: "Press Function Key F1". Symbol for the

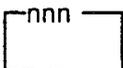
ENTER key (RETURN key), meaning: "Press ENTER key".

These two symbols together mean: "Press the ALT and F1 keys simultaneously".

Simultaneously means: first press the switch key (e.g.: CTRL, ALT or SHIFT) and hold it down, then toggle the second key and release the switch key.

Symbol for the menu dependent entry window.

1.3 Introduction to the MS-DOS Operating System.



1.3.1 General

The MS-DOS Operating System controls the execution of application programs and hardware functions such as disk instructions and supports user utilities.

Although PLC programmers do not need an extensive knowledge of MS-DOS, some basic commands are explained on the following pages in order to help them with the MC5-Programming Software.

Files and their use, as well as the structure of MS-DOS commands (command syntax), are explained in this chapter. Some MS-DOS commands, together with a short description, are listed in chapter 1.3.4. These commands are only executed after ENTER has been pressed. A few characteristics concerning the execution of MS-DOS commands are explained in chapter 1.3.5.

MS-DOS commands can only be executed from the MS-DOS command level when the so-called prompt is displayed. A typical prompt consists of a character representing the drive identification (in this case hard disk C), the character "»" and the blinking cursor (here the underscore).

C»

When entering MS-DOS commands without the drive identification, the operating system will only look for the necessary files and programs in the current directory of the current drive.

In order to change drives, enter the desired drive identification (character and colon (:)).

Example: To change to drive A:



Type A:
and press ENTER

The new prompt appears:

A»_

In general, any of the following drive identifications may be used:

A: Diskette drive A or diskette in drive A

B: Diskette drive B or diskette in drive B

C: Hard disk C or hard disk partition C

D: Hard disk D or hard disk partition D

MS-DOS offers the possibility to call up files with abbreviated commands. The following commands appear in the MS-DOS manual:

PATH command

This command instructs the operating system to search for a file on the specified drives and in the required directories. Enter the search path behind the command PATH.

Once this command is executed, the operating system will not only look for the specified file in the current directory, but also on every drive and/or in any directory included in the search path. Multiple paths may be specified, but have to be separated by a semicolon.

PROMPT command

With this command, the appearance of the prompt can be changed. A meaningful change would be to show the current drive identification and directory before the blinking cursor.

Both commands are briefly explained in chapter 1.3.5. of this manual (keyword: AUTOEXEC.BAT).

1.3.2 Files, File Use

All texts entered (e.g. SPS-files) are stored by MS-DOS in files which have been created previously. These files can be arranged and saved orderly in directories.

While working with the MC5-Development Software, the user will be prompted to enter a filename. The program will then automatically create the file.

On MS-DOS level, a user file can be created by using the MS-DOS command COPY CON and by entering a filename. Creating a so-called batch file" (storing a sequence of commands) with a file extension ".bat" is very useful in practice as it simplifies the startup procedure. The creation of a ".bat" file is explained in chapter 1.3.5.

The user makes up his own filenames. Within directories only unique filenames can be used. A filename contains no more than eight alphanumeric characters. No spaces are allowed. When entering commands and/or filenames, no distinction is necessary between either capitals or small characters. The operating system will accept either, e.g. PRO_1234orpro_1234.

When selecting a group of files (e.g. all texts, all programs for plant B4, etc.), it is recommended to use filename extensions. The extensions are connected to the filenames by the character period (.) and may contain no more than three characters, (e.g.: PRO_12.B4).

Some filenames are not to be used, as these names are used by the operating system itself. Device names like AUX, CLOCKS, COM, CON, KEYBD\$, LPT, LST, NULL, PRN and SCRNS\$ are being used by the system. Please check the MS-DOS manual for a complete list.

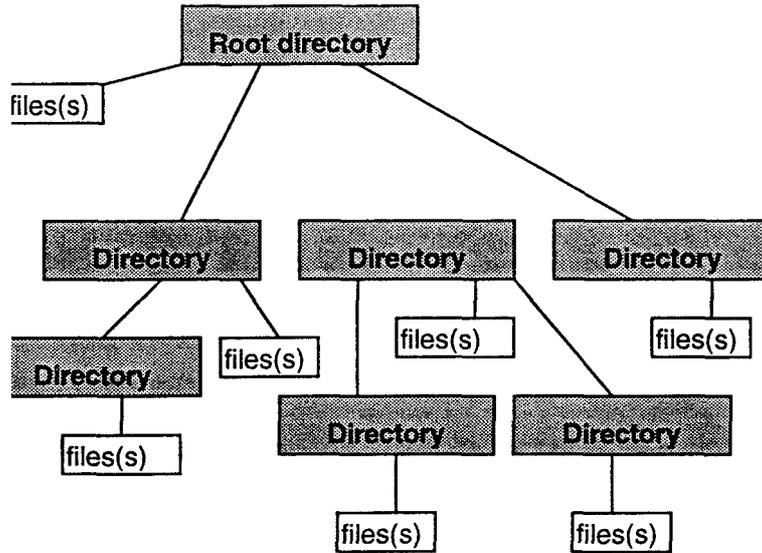
The file extensions .SYS, .EXE, .BAT, .COM are used by MS-DOS. These file extensions should only be used when creating files with purposes similar to the ones of MS-DOS. For creating a batch file with the extension .BAT, see chapter 1.3.5.

File Use

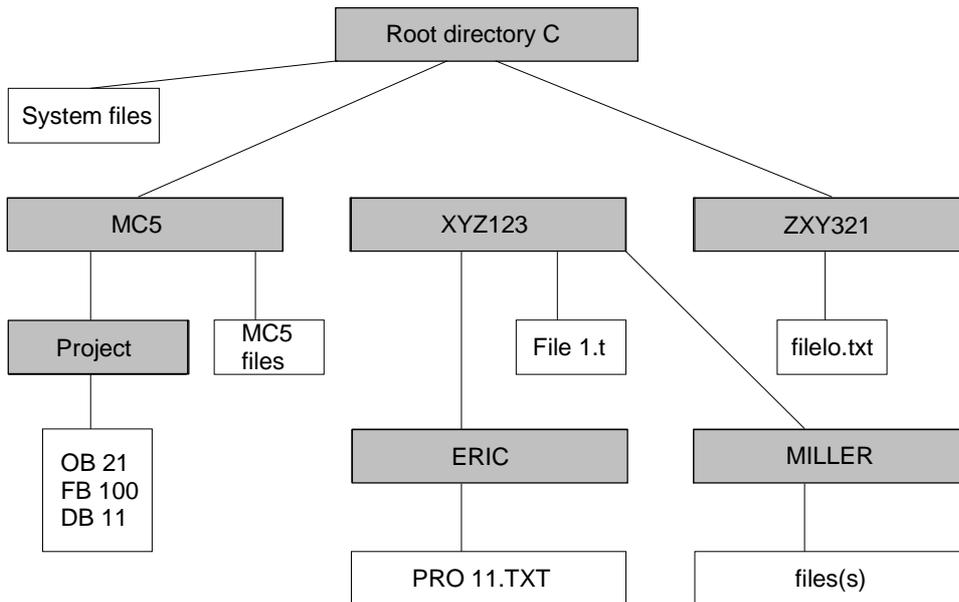
The computer offers an organization system for storing files (root directory, directories and subdirectories), which branches like a tree. These files can be used in the same way as files in a normal office filing system. The root directory is always designated by the back slash (" \").

Directories, subdirectories and files are created by the user. The following scheme gives an overview of the way files might be arranged:

File Organization



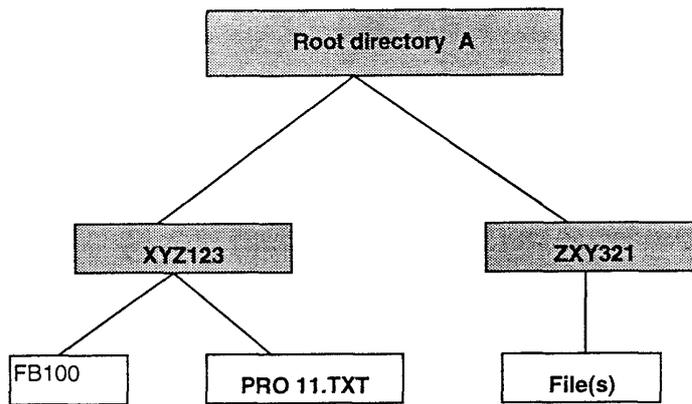
Since the user is able to create directories and subdirectories, a personalized organization structure may be set up. It could be organized on the hard disk as follows:



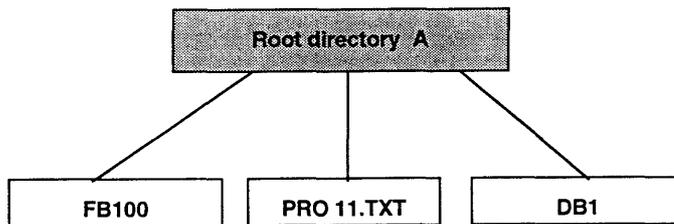
The examples used in this manual relate to such a directory structure.

If files are to be saved on diskette, it is better not to create directories and/or subdirectories. The file structure on the diskettes could then be as follows:

First diskette in drive A:



Second diskette in drive A:



1.3.3 Working with

With the help of three simple MS-DOS commands, directories can be manipulated. Each command is described below (the general command structure (command syntax is explained in chapter 1.3.4):

Make a new directory with:

MD or MKDIR Meaning:
make directory

Change to another directory with:

CDorCHDIR Meaning: change
directory

Show the contents of the current directory:

DIR Meaning: directory

Select always a directory name, which indicates the purpose or usage of the directory contents. A directory name contains no more than eight characters. No spaces may be used.

Please refer to the operating system manual of the computer for the use of special characters in directory names.

Examples:

In order to install the MC5-Programming Software, create a subdirectory (with the name MC5) in the current root directory on drive C:

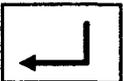


Command line: C_ Command: MD
MC5



Command line: C_
Command: DIR

The contents of the root directory of drive C will be displayed on the screen. The name of the MC5 directory will also be shown.



Command line: C_ Command: CD
MC5



Command line: C: MC5 Command:
CD

The screen displays the current directory:

C:\MC5

Command line: C:\MC5

In order to return to the parent directory, enter two periods (..) behind the DOS command CD.



Command **CD..**

In order to return immediately to the root directory regardless of the current directory, enter a back slash (" \") behind the command CD.

Command **CD **

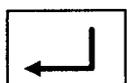
The current directory is again the root directory of drive C:

Command line: C: _

1.3.4 MS-DOS Commands



MS-DOS commands may be entered in capital or small letters from MS-DOS command level (prompt at the beginning of the line). Wrong characters can be erased with the BACKSPACE



Commands will be confirmed and executed after RETURN has been pressed.

On the following pages some commands are briefly explained, when displaying these commands, the following identifications are used for recognition:

Bold Printing:

Bold printing will be used for inputs, commands and special characters, such as colon (:) and backslash (\).

CAPITALS (UPPER CASE):

Capitals are used for names of drives and directories.

Here, use the required target identifications together with the following:

DR Drive (A, B, C,...)

DIRNAME Directory Name

FILENAME Name of File

MS-DOS commands are structured as follows (command structure):

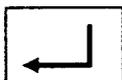
Command Parameter Below follows the copy

command as an example:

**Command Parameter1 Parameter2 (Source)
(Target)**

In example 1, a file called 'fb100' (saved in the directory PR0111 on hard disk C) is being copied to a diskette in drive A:

Example 1:

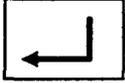


COPY C:\PR0111\fb100A:

Now the diskette in drive A contains the file fb100.
(The contents of the diskette in drive A can be displayed with the MS-DOS command DIR A:).

Example 2:

On the diskette in drive A, a directory TEXT10 has been created with the MS-DOS command MD (or MKDIR). Now the file 'fb100' has to be copied to the directory TEXT10.



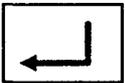
```
COPY C:\PR0111\fb100A:\TEXT10
```

File 'fb100' may now be found in directory TEXT100 on the diskette in drive A.

Try again to display the contents of the diskette in drive A (use MS-DOS command DIR A:\TEXT10).

Example 3:

The filename 'fb100' can also be "changed" to 'fb11' by using the COPY command:



```
COPY CAPR0111\fb100 A:\TEXT10\fb11
```

File 'fb11' may be found in directory TEXT10 on the diskette in drive A. Use the MS-DOS command DIR A:\TEXT10 to display its contents .

The contents of files 'fb100' and 'fb11' are identical. This means that Block FB11 contains the same Block identification (BLOCK#FB100) in the first line and, if used, will create a transfer error.

List of some MS-DOS Commands**Change directory**

CD or CHDIR

changes the current drive and the current directory names.

CD DIRNAME or CHDIR DIRNAME

Changes from the current directory to directory DIRNAME.

CD.. or CHDIR..

Changes from the current directory to the parent directory.

COPY

```
COPY DR1:\DIRNAMEBfilename DR2:\DIRNAMEBfilename
```

copies the file "filename" from the "source" to the "target".
i.e.: from drive DR1, directory DIRNAME to drive DR2, directory DIRNAME.

Attention: If the target drive already contains a file with the same name, this file will be overwritten. The original information will be lost.

DELETE

DEL filename

Deletes the file "filename" in the current directory without prompting for confirmation.

DR:\DIRNAME/filename

Deletes the file "filename" in the directory DIRNAME of drive DR:, without asking for verification.

DEL DIRNAME

Deletes all files in directory DIRNAME . With this command the computer will ask for verification and expects confirmation for further execution of this command (Enter "Y" for Yes, "N" for No and confirm by pressing RETURN). The empty directory will remain on disk, but may be deleted with the MS-DOS command RD (or RMDIR).

DISPLAY DIRECTORY (DIR)

All filenames and directory names within the current directory will be listed. The file size (in bytes) and the date/time, of the last time it was saved, is shown as well.

DIR DIR filename

Displays the file with this filename. The file size (in bytes) and the date/time, of the last time it was saved, is shown as well.

DIR DRADIRNAME

Displays all filenames and directory names within the current directory. The file size (in bytes) and the date/time, of the last time it was saved, is shown as well.

DIR DR:\DIRNAME /P

Displays all filenames and directory names of the directory DIRNAME of Drive DR: per "page" (screen size). To view the next screen (page), press any key.

DIR DR:\DIRNAME /W

Displays all filenames and directory names of the directory DIRNAME in four columns. The file size and the date/time are not shown.

The switches /P and /W are options.

Copy diskettes with MS-DOS command DISKCOPY

DISKCOPY DR1: DR2:

Copies the contents of the entire diskette in drive DR1 to a diskette in drive DR2. Already existing files on the diskette in drive DR2 will be erased. (In case a new MS-DOS version is used, the system will format your diskette while copying).

Format diskettes with MS-DOS command FORMAT

FORMAT DR:

Formats a diskette in drive DR:.

FORMAT DR: /v

Formats a diskette in drive DR:, with a provision to enter a volume label.

FORMAT DR: /4

Formats a 360 Kbyte diskette (in drive DR: on two sides), when placed in a 1,2 Mbyte drive of an AT or 386. The switches /v and /4 are options.

Create a directory with MS-DOS command MD or MKDIR

MD DIRNAME MKDIR
DIRNAME

Makes (creates) a directory with the name DIRNAME in the current directory.

Change filename with MS-DOS command REN (rename)

REN filename.old filename.new

Renames a file, e.g. changes the old name to a new name. If the name already exists, an error message will appear.

Remove a directory with MS-DOS command RD or RMDIR

RD DIRNAME RMDIR
DIRNAME

Removes the directory with the name DIRNAME. The directory must be empty before removing it. See DEL to delete files .

For other commands and examples. please refer to the MS-DOS manual.

1.3.5 Grouping of Files

Wildcards in filenames:

A wildcard is a character, which can replace one or more characters in a filename. The use of the wildcards Asterisk (*) and Question mark (?) are explained below. For more specific information, please refer to the MS-DOS manual.

Examples where the wildcard "*" (Asterisk) is used:

Suppose that all text files have the extension .TXT. In order to know which files with this extension are in the current directory, enter the following command:

```
DIR *.TXT
```

All files with the extension .TXT in the current directory will be displayed.

If all files in the directory PRO_11 on the hard disk C are to be copied onto a diskette in drive A, enter the following command:

```
COPY C:\PRO_11\*. * A:
```

The wildcards *.* represent all files in the directory C:\PRO_11.

Examples where the wildcard "?" (Question mark) is used:

Several files have been created with names like 'fb10', 'fb20', 'fb30', etc.. In order to find these files in the current directory, enter the following command:

```
DIR fb?0
```

All filenames starting with the characters 'fb' and followed by any character and the zero will be displayed on the screen.

The wildcard "?" can be used more than once in a filename, e.g. 'fb??'. Both wildcards can also be used in conjunction:

```
DIR fb??.*
```

In other words, and according to the example above, all files from the current directory will be displayed when they meet the following requirements:

- "f" and "b" are the initial characters in the filename,
- one or two other characters, which can replace the question marks,
- follow the initial characters as part of the filename and any or no file extension

For example, filename 'fb100' does not comply with these conditions, because in this case "f" and "b" are followed by *three* characters (100). This does not agree with the *two* question marks in the command. **Program file AUTOEXEC.BAT**

After the computer is switched on, MS-DOS will, first of all, look for the AUTOEXEC.BAT-file.

In this so called "batch file" (similar to batch processing), commands can be entered. These will be executed every time the computer is switched on.

With the help of the MS-DOS command COPY CON filename (copy directly from the console), such a batch file can be created. Please be aware of the following:

- Entries can only be edited on the current line. Once ENTER RETURN) has been pressed, no more changes can be made !!
- Press CTRL and the Z-key simultaneously to terminate the file creation.
- Press ENTER to save the newly created file. If the file already exists, the old file will be overwritten by the new file. The contents of the old file will be lost!!

When creating a new AUTOEXEC.BAT, the following command lines could be useful:

ECHO OFF

This command instructs MS-DOS not to display the commands of the AUTOEXEC.BAT file on the screen as they are executed.

PROMPT \$P\$G

This command sets the command prompt to display the current drive and path followed by the greater than sign (»):

DR:\DIRNAMBDIRNAME»_

e.g.: C:\ABT_12\ERIC»_

i.e.: the current drive and current directories will be shown before the blinking prompt.

KEYB UK or KEYB US

This command changes the keyboard layout to the English (English keyboard driver) or to the American version (on other systems, a different command may be required). Please refer to the DOS-manual.

PATH

Normally, when searching for a file, the system searches in the current directory only. With the PATH command, the operating system is ordered to search for the file in other directories and subdirectories (only the ones specified in this path command) as well.

PATH= C:\;C:\DOS;C:\MC5;

The operating system will first search the specified file in the root directory of drive C, then in the DOS directory and finally in the subdirectory MC5. The search paths must be separated by a semicolon (;) **CD**

DIRNAMBDIRNAME

Instead of the directory called DIRNAME, enter the name of the directory where the files are to be saved. MS-DOS will change automatically to this directory when the MC5 software is started.

MC5

The program MC5.EXE will automatically be executed. The main menu, with the opening screen, will be displayed.

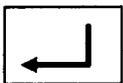
Example to create an AUTOEXEC.BAT file:

First, return to the root directory by entering:
CD\
Command line:

C_

Start creation:
COPY CON AUTOEXEC.BAT
Command line: _ (blinking prompt)

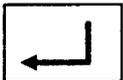
Enter:



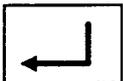
©ECHO OFF



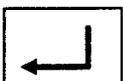
PROMPT\$P\$G KEYB



UK



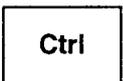
PATH=C\;CDOS;CMC5



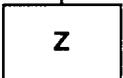
CDVDIRNAMBDIRNAME



MC5

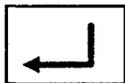


In order to end the input, press CTRL and the Z-key simultaneously.



Displayed on the screen by: ^Z

Confirm with RETURN (or ENTER).



This ends the creation of the batch file. Every time you start the computer, this batch file will be executed.

2. Installing the MC5 Programming Software

2.1 Contents of the MC5 Programming Software

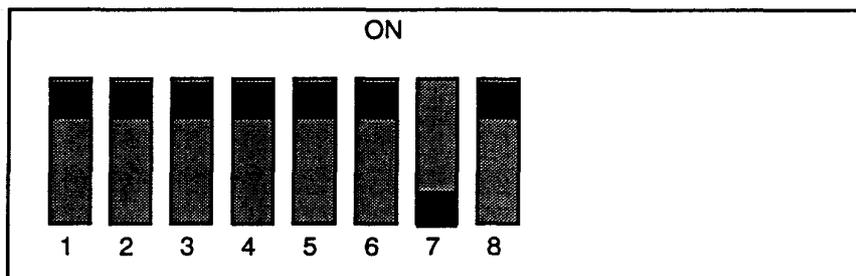
Requirements:

- MC5 Card or Off-line or Serial Dongle
- Program diskettes (5,25" or 3,5")
- Demo programs
- User manual

The MC5 Card

The MC5 card is installed in an empty slot of the computer. There will be no difficulty to insert the card, but please do pay attention to the manufacturer's instructions (see the instructions manual of your PC). If no explicit limitations are mentioned, a professional installation of the MC5 card will not void the guarantee given by the computer manufacturer.

Check the settings of the DIP-switches before installing the MC5 card,.



The default configuration of MC5 is set to communicate with the interface card via base address 100h (corresponding to the DIP-switch setting mentioned before). The card has 8 alternative (100h-107h) I/O addresses. To change the base address, run the program PATCHxxx.COM. The program will show the new DIP-switch setting for the interface card and will reconfigure the MC5 software. Since this program is unique for every version of MC5, the symbol "xxx" indicates the appropriate version, e.g. 311 is version 3.11.

To run PATCH with the help text in English, add "/e" to the command.

Example:

Command: patch /e

2.2 System Requirements

MC5 Programming Software can be used on many different computers. However, for best results with the MC5 Programming Software, the system should meet certain minimum requirements:

Computer

- IBM-AT or compatible
- Minimum Memory of 640 KByte
- Appropriate Video Interface, e.g.:
- Monochrome Graphic Adapter Colour Graphic Adapter
Enhanced Graphic Adapter
 - Diskette drives 5,25" and/or 3,5" (see chapter 18)

720 Kb for PG635 diskettes

1,2 Mb for PG685 diskettes

360 Kb for PG675 diskettes

Operating System Requirements

- MS-DOS version 3.31 or higher

The presentation can be either in colour or monochrome (depending on the type of monitor).

A hard disk with at least 2.5 Mb free storage capacity. (A hard disk with cache is highly recommended!)

2.3 Making a Spare Copy

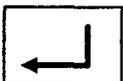
Before installing the MC5 Programming Software on your hard disk, please make a copy of the original diskettes.

Preparations

Protect the original diskettes with the write protect tab and keep a suitable MS-DOS formatted diskette close at hand. In order to start the copy procedure, use the following MS-DOS command and press RETURN to confirm:

DISKCOPY DR: DR:

Copy Procedure for a Computer with Two Identical Diskette Drives:



DISKCOPY A: B:

The MS-DOS operating system will display the following message:

Insert SOURCE diskette in drive A:

Insert TARGET diskette in drive B:

Strike a key when ready ...

Follow these instructions. The contents of the original diskette (SOURCE) will be copied to the spare diskette (TARGET).

The operation has come to an end when the operating system displays the following message:

Copy any other diskettes (Y/N)?

To end the copy procedure, press N.

Copy Procedure for a Computer with only One Diskette Drive



DISKCOPY A: A:

The MS-DOS operating system will display the following message:

Insert SOURCE diskette in drive A:

Strike a key when ready ...

Follow the instructions. The contents of the original diskette will be copied into the memory of your computer. The first part of the operation has come to an end when the operating system displays the following message:

Insert TARGET diskette in drive A:

Strike a key when ready ...

Follow the instructions. The contents of the original diskette (SOURCE) will be copied to the spare diskette (TARGET). If the amount of memory of the computer is insufficient, this step will have to be repeated.

The operation has come to an end when the operating system displays the following message:

Copy any other diskettes (Y/N)?

Press N to end the copy procedure.

2.4 Installing the Program on the Hard Disk

Before working with MC5, it must be installed on the hard disk. It is not possible to run the program from diskette.

In order to install the MC5 Programming Software on the hard disk, run the installation program INSTALXX.EXE on the MC5 diskette. Where XX can be replaced by EN for international (English), NL for Dutch or D for German installation

By answering the questions, the MC5 installation program will install the software and will help to configure the system for optimal performance.

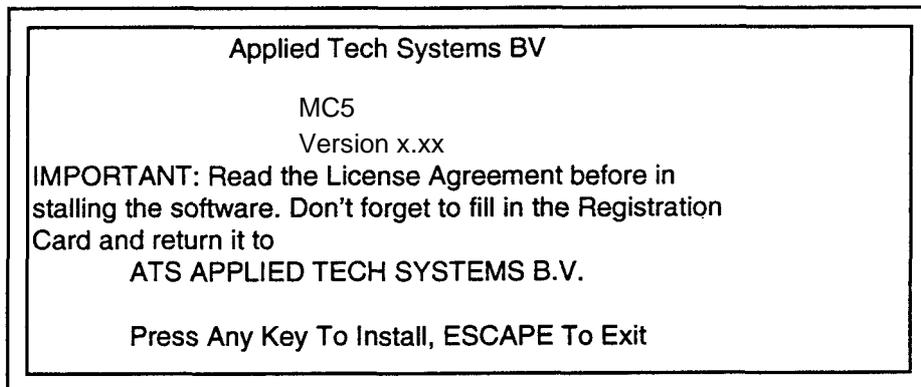
Example:

The program diskette has been inserted in drive A.
Enter one of the following commands and confirm this by pressing RETURN:



```
A:
INSTALEN                OR
INSTALNL                OR
INSTALD
```

After a brief delay, the next screen will be displayed. The symbol "x.xx" indicates the revision of the software:



2.5 Program Execution

After installation of the MC5 Programming Software, the program can be run using some MS-DOS commands. The following example is based on PG working experience.

PLC: Several diskettes for one Project.

Expert PG675/685 Programmers are familiar with procedures for large projects. They know how important it is to maintain programs structured clearly and efficiently. It is customary to keep PLC-programs on several diskettes. Use a new set of diskettes for each new project.

PLC:
Several
diskettes
for one
projekt

Such a set may contain:

- program diskettes for automatic and manual control diskettes
- diskettes for data handling in the PLC
- a copy of the Programmable Controller.

The programmer then uses only the work diskette, which contains only the files currently required.

Edited programs are copied to the respective project diskettes. In fact, all programs are stored in several "files".

Example:

A project is known by the name of FIRM and consists of the following diskettes:

- copy of the programmable controller
- transportation,
- material flow,
- RFZ,
- network-master
- network-slave
- a work diskette.

This procedure can also be applied advantageously when working with MC5 that is installed on a hard disk and uses the MS-DOS operating system (improving speed and efficiency). Instead of the set of diskettes, create a filing system on the hard disk - directories and subdirectories -(see also chapter 1.3.2). It will only take a few MS-DOS commands. Remember, directory and subdirectory names in DOS should not contain more than eight characters. Quotation marks and some other characters are not allowed.

MC5:
Several
directories
on the hard
disk for one
projekt

Example:

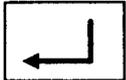
The project is stored in a directory named FIRM, in which the following subdirectories have been created: PCABZUG, FT-TECH, MAT-FLOOD, RFZ and NETWORK. The subdirectory "network" contains the subdirectories NW-MAST and NW-SLAVE. The current working directory contains the name CURRENT.

An appropriate search path must be specified in the PATH command to be able to work from every directory with the MC5 Programming Software. This search path directs the system to the directory where the MC5 Programming Software is installed. In other words, the system is told where the program is to be found.

The existing path is displayed at the prompt. The MS-DOS command PATH can be used now. Enter immediately after the command the required path name and confirm by pressing RETURN. The following example could apply:

**PATH
command**

```
C:PATH
```



```
PATH=C:\DOS;
```

If the MC5 software is in the directory "MC5" on the hard disk, "C:\MC5;" will be added to the PATH command. Confirm by pressing RETURN:



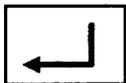
```
C:PATH=C:\DOS;C:\MC5
```

If anything is added to the existing path by using the path command, the path will only remain valid until a new PATH command is executed, until a ".BAT" file is called up or until the computer is switched off.

Add the line above to the AUTOEXEC.BAT instead of entering this command every time (see chapter 1.3.5.). This file will be executed at every new start of the computer (e.g. the function of OB20 and/or OB22 in the programmable controller). The command could be as follows:

```
PATH=C:\;C:\SYSTEM\DOS\;C:\MC5;
```

After entering the search path, create all subdirectories in the MC5 directory. To create a directory with the name FIRM, use the command MD or MKDIR (make (sub)directory, see chapter 1.3.4). Then, enter the following command and confirm by pressing RETURN:



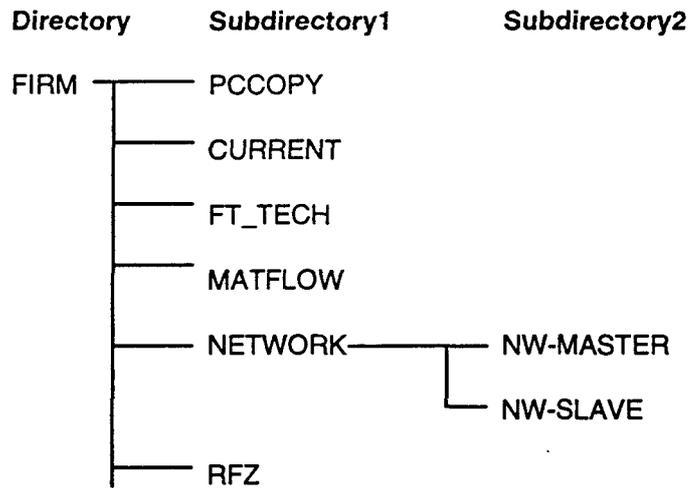
```
MD\FIRM
```

Now change to subdirectory FIRM by using the command CD or CHDIR (change directory, see chapter 1.3.4):



```
CD\FIRM
```

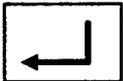
Create the following tree (structure) of subdirectories by using the command MD:



For running the software from the sub-directory NW-MASTER , change to this directory by using the following command:

```
CD\FI RMN ETWORK\NW-MASTER
```

Now, run the MC5 Programming Software by entering the program name "MC5" and confirm by pressing RETURN.



MC5

The initial screen of the MC5 Programming Software will then be displayed and the system is ready for use.

2.6 Using extended memory

When your computer is equipped with extended memory configured as XMS memory, you can activate MC5 to use this memory. Using XMS allows you to handle very large Symbols files and large Blocks. However, the use of XMS memory may marginally slow-down several functions of MC5. This means that if you do not really need XMS functionality to edit large files you are advised to use conventional memory. To configure extended memory as XMS memory you install the driver HIMEM.SYS (or HIMEM.EXE) in your CONFIG.SYS file. In general you need to add the following line to your CONFIG.SYS:

```
DEVICE=C:\DOS\HIMEM.SYS
```

HIMEM.SYS is available from MS-DOS 5.0.1

XMS use can be activated in two ways:

using the Command-line parameter '/X' at start-up of MC5 (please refer to chapter 2.7).

by configuration in the Preset after which the Preset should be saved and MC5 should be re-started (please refer to chapter 6.2.6).

If XMS memory is activated the Function bar of the Ctrl-key in the Main menu will contain the option F8 XMS. Pressing Ctrl+F8 will display the XMS-Information window, giving you information on the amount of XMS memory available and in use.

ATS-S5 104680 Bytes free MAIN MENU - FULL VERSION V X.XX		XMS - Information
XMS version	: 3.00 (3.07)	
XMS handler address	: 026F:00B6	
Largest XMS block available	: 6832 Kb	
XMS-handles available (total)	: 32	
No XMS-handles allocated to ATS-S5		
F1	F2	F3
F4	F5	F6
F7	F8	
Preset	System	XMS

2.7 Command Line Parameters

When starting up the MC5 Programming Software, use the Command Line Parameters to define certain user configurations of the MC5 Software. The available options are listed below:

D:\MC5\PILOT1\mc5 /h

Description:

mc5 {[options]} [«filename»]

Parameters:

/H	Help (shows this list) Continuous
/D	cursor. Do not switch video
/B	mode German version English
/G	version Path for preset confi-
/E	guration file MC5.CNF Preload
/V«path name»	filename into the editor buffer #1

«filename»

Please, also pay attention to chapter 6.2.6. "Preset: Special"

3. Blocks

3.1 Filenames

Use MS-DOS filenames as Block names when creating Blocks in MC5, i.e.:

BLOCK#FB1 - DOS filename FB1

BLOCK#OB13 - DOS filename OB13

It is essential to use corresponding names. During compilation of a Block call (JU FB1), the program will only search for the MS-DOS filename (and not for the Block Identification).

MS-DOS uses specific filename extensions, e.g. ".EXE", ".COM", ".BAT". Conflicting filenames and/or extensions are not allowed. MC5 Programming Software reserves certain filename extensions, such as:

.MC5

.SYM

.CNF

.PRN

3.2 PLC-Blocks

3.2.1 Command Blocks

3.2.1.1 General Information

The following types of command Blocks are used when programming in MC5.

OBO OB255 -Organization Blocks

PBO PB255 -Program Blocks

FBO FB255 -FunctionBlocks

FXO FX255 -ExtendedFunction Blocks

SBO SB255 -Sequence Blocks

DBO DB255 -Data Blocks

DXO DX255 -Extended Data Blocks

Note:

There is no check on whether the Block numbers used is

MC5 allows unformatted instruction lines to be entered. With the proper Presets, the lines are automatically placed in the correct format when the cursor leaves the line. The Preset "Syntax check: Yes" (see chapter 6.2.3.) should be selected. The first line of the Block should also contain a valid Block Identifier such as:

BLOCK#FB111

LIB-Nr.

A five-digit LIB-number is entered on the next line. This number is created by the MC5 program, e.g.:

LIE #12345

If no LIB-number is entered, MC5 will generate the LIB-number from the system date of the computer while compiling into PG form. This date is the same as the actual date (if it is not, please check the system date). The LIB-number created by the MC5 software consists of one or two digits for the day, two digits for the month and one digit for the year (dd mm y).

Example: Date21.10.93

LIB #21103

Offset-addresses

Instruction lines automatically receive offset addresses. These are dependent on the commands in the preceding lines.
Block Header and Parameter definition statement.

Note:

Because the colon (:) is also the line marker commands containing a colon must be written, with TWO colons, e.g. ":Q" as Colon:) "::G".

Line types in the MC5 Programming Software

Several kinds of line types are at your disposal during the creation of programs. These may contain the following special characters:

Line types
Hashmark #)

Colon:)

Instruction lines containing PLC statements; label indicator(e.g. Loop:).

Equal sign =)

Lines defining Formal Operands.

Semicolon;)

Additional comment lines Doc lines) can be inserted in between STL lines. These comment lines will be copied to PG formatted Documentation Blocks when transferred.

No marking from column 20 "Empty Lines" (lines without commands) with comments.

3.2.1.2 Function Blocks

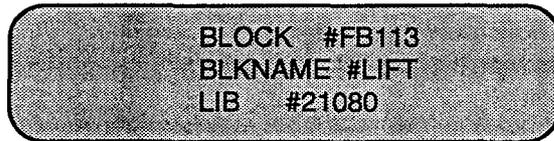
In the Block definition (Block Header) in case of the Block types FB and Block Header FX, an additional name must be entered .

Block Header

BLKNAME #LIFT

Example:

The DOS file FB 113 was edited on 21.08.90. The Block Header is FB 113 and the name is LIFT. Therefore, the following Block Header was entered:



Block Parameters must be entered immediately after the Block Header. The lines have the following structure:

**Block Parameter
(Formal
Operands)**

DES #Name Type:

[Format]

Name: Description (max. 4

characters.)

Format KS:

To enter a blank (Ox20h, 32d), press CTRL and the SPACE BAR simultaneously. The character period (".") will be displayed on the screen.

KS = Max. 2 alphanumeric characters

KF = Fixed point number from -32768 to +32767

KT = BCD-coded timer value from 1.0 to 999.3

KC = Counter value (BCD-coded) from 0 to 999

KG = Floating point number from 0,17014120" 0,1469368e^M
(not in the case of PLC 115U)

Type: Parameter type of the descriptor

(I, Q, D, T,
C or B)

Where:

I = Input parameter

Q = Output
parameter

D = Date

T = Timer

C = Counter

B = Block

Format:

Type related Format of descriptor (BI, BY.W, D, KM, KH, KF, KS, KF, KY, KT or KC)

Where:

- BI = Operand with Bit address
- BY = Operand with Byte address
- W = Operand with Word address
- D = Operand with Double word address
(not in the case of PLC 115U)

Constants:

- KM = Binary pattern (16 positions)
- KH = Hexadecimal constant (max. 4 digits)
- KY = 2-byte number ranging from 0 to 255 dec.
(separated by a comma)

Available type/format combinations are:

Type	Format
F,I,Q	BI, BY, W, D
D	KM, KH, KF, KS, KG, KY, KT, KC
T,C,B	No additional format definition

The name of the Formal Operands will be entered behind the instruction and followed by an equal sign when using Formal Operands in instruction lines, e.g.:

0009 :A =MELD

Calling Blocks

Attention:

Only the Block types FB/FX are reloaded. No check occurs whether other Blocks called exist or not.

A Block is called by entering a corresponding jump instruction (e.g. JU FB128). The corresponding Block must exist on the same DOS drive (e.g. on harddisk C, with the name FB128) from which the Block to be edited was loaded. If a new Block is created, the called Block must exist in the current DOS directory as it is reloaded from there.

Be sure that the called Block is available in the current directory. When it is in modified form in another edit buffer, the changes will not be taken into account. Every Block is only loaded once.

After having entered the jump instruction the parameter header list of the called Block will be displayed/The parameters in the list can be entered accordingly.

Entering Parameters in Blocks

After calling the function block ,the list of corresponding Block parameters is displayed. The actual operands should be assigned to these Formal Operands (e.g. Assignment of the actual operands I 0.0 or F 1.6 to the Formal Operand "IN").

Example:

In Function Block FB128, the following Block Parameters were defined:

```

BLOCK # FB128
BLKNAME # TURN
LIB # 17071
DES # IN I:BI
DES # OUT Q:BY
;more instruction lines
: BE
    
```

Function Block FB128 is called from Program Block PB2:

```

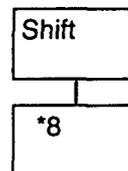
BLOCK # PB2
LIB # 17071
00000 :L FW254
00002 :T DW4
00004 :JU FB128
NAME # TURN
IN = F 1.6
OUT = QB 1
;more instruction lines
: BE
    
```

The normal STEP®5 guidelines from SIEMENS apply when using Formal Operands.

3.2.1.3 Segments

In MC5, segments are separated by indicating the end of Segment.

To mark the end of a Segment, enter three times the character Asterisk (*) at the beginning of the instruction line. A Segment Comment with no more than 32 characters can be entered immediately after. Enter the Segment Comment for Segment 1 in the comment area of the first line of the Block Header.



Example:

```

BLOCK# FB114 SEGMENT COMMENT OF SEGMENT 1
LIB # 21051
BLKNAME # TEST
0000A : C DB 10
0000C : L DW 21
0000E : T FW 100
00010 : L DW 22
00012 : T DW 102
00014 : *** SEGMENT COMMENT OF SEGMENT 2
00016 : L DW 223
00018 : T FW 104
0001A : BE
    
```

3.2.1.4 Jump Instructions and Jump Markers

The Jump Operations "JU=" (JC=) allow to make jumps within a Segment (analogous to PG). The jump mark is a label consisting of 1 to 4 characters.

The instruction "JR=" is an exception, it allows a jump to a label outside the segment. The MC5 Programming Software allows a jump that exceeds a Segment. This jump instruction allows a larger jumping distance (15 bit offsets). The distance of the jump does not have to be calculated manually. The target labels for the JR jump instruction must be unique within the Block.

Example:

```

BLOCK      # FB12
BLKNAME   # JUMP
LIB       # 123401
:
:
00016    : JR = FAR LABEL IN SEGMENT 3
:      ***
:
00018    : L FW 200
0001A    : T FW 202
:      ***
:
:      FAR
:
0001C    : BE
    
```

3.2.1.5 Peripheral Addressing

The syntax of all instructions for addressing peripherals, starting from version 2.00 of MC5 Programming Software, has been changed from PB to PY. All ASCII-files created in previous MC5 versions must be changed manually (see chapter 8.3.3, functions "Search/Replace").

3.2.2 Data Blocks

General Information

The MC5 Programming Software allows editing of the following Data Blocks:

DBO ... DB255
DXO ... DX255

To create Data Blocks, all editor functions are at your disposal. Additional comment lines can be used.

The following constant formats are available for Data Blocks:

KM Word: 16 Bit binary
e.g.: KM 01010101 01010101
When less than 16 characters are entered, leading zeros are added.

KH Word: 0 ... FFFF
e.g.: KH OAOB
When less than 4 characters are entered, leading zeros are added.

KY Word: 0,0 ...255,255
e.g.: KY 5,128

S ASCII-string: resp.

KS ASCII-string:
e.g.: KS TESTTEXT;
KS must be terminated by a (;) semicolon ;) If the last character in the string happens to be a semicolon, the semicolon must be entered twice. If you want to enter a blank (0x20h,32dec), you must press the CTRL and the SPACE BAR at the same time.

KF Word: -
32768 ...32767
e.g.: KF +2

KT Word: 0,0 ...999.3
e.g.: KT 500.2

KC Word: 0 ...999
e.g.: KC 312

KG Double word: Range Value:
0,1701412e³⁹ 0,1469368e³⁸ e.g.: KG + 2000000+01 (The input is done with base of ten).The mantissa prefix is inserted if it is not present. If the mantissa does not contain seven characters, zeros will be added.

The ZL format of the PG675 is currently not supported.

Repetition Factors in Data Blocks

If Data Words with equal values are repeated in a Block, it is possible to enter a repetition factor.

The repetition factor is entered in the line preceding the data set, followed by opening parenthesis., The set of data to be repeated in the following lines should be entered. In the next line after the data set, closing parenthesis must be entered. It is possible to nest repetition factors up to nine levels.

During compilation, the repetition factor is broken up. When the Block is saved to an MS-DOS disk(ette), the repetition factors are also saved. If the break-up is intentional, use the function "Block Copy" from the editor menu.

Example:

Entering:

```

BLOCK#DB21
LIB #15062
00000: 3      (           =0012
00000:      KH           =01101000 10110101
00001:      KM
00002:      )
00006:      KC           =5
00007:      KS           =MC5. Programming;
00016:      KT           =12.2
    
```

is equivalent to:

```

BLOCK#DB21
LIB #15602
00000:      KH           =0012
00001:      KM           =01101000 10110101
00002:      KH           =0012
00003:      KM           =01101000 10110101
00004:      KH           =0012
00005:      KM           =01101000 10110101
00006:      KM           =5
00006:      KZ           =MC5.Programming;
00007:      KS
    
```

4. Help System

4.1 Call up Help

screens

Call up Help System

Alt

F1

PgUP

PgDN

Esc

The Help System provides quickly information on specific MC5 topics.

When ALT and F1 are pressed simultaneously, it is possible to call up the Help System from any menu and submenu.

A window will be displayed in the working area. This window contains a help text pertaining to the current MC5 function. From the Main Menu, help screens belonging to the Main Menu are displayed and from the Editor Menu, help screens belonging to the Editor are displayed.

With the PgUp and PgDn keys it is possible to scroll, page by page (screen size), backwards and forwards through the help text.

Press ESC to exit the help screen.

Example:

Start of help text for the editor keyboard commands

```

NIS-S5 124984 Bytes free  HELP MENU
      *** HELP ***
EDITOR - KEY COMMANDS
Positioning the cursor
'Ctrl-S' ← Cursor left      'Ctrl-Q R' 'Ctrl-PgUp' Begin of file
'Ctrl-D' → Cursor right    'Ctrl-Q C' 'Ctrl-PgDn' End of file
'Ctrl-E' ↑ Cursor up       'Ctrl-Q E' 'Ctrl-Pos1' Begin of screen
'Ctrl-X' ↓ Cursor down     'Ctrl-Q X' 'Ctrl-End'  End of screen
'Ctrl-A' Word left         'Ctrl-R'   'PgUp'     Screen up
'Ctrl-F' Word right       'Ctrl-C'   'PgDn'     Screen down
'Ctrl-Y' Delete line

PgDN, ESC
00026 :****
F1     F2     F3     F4     F5     F6     F7     F8
Index
    
```

Activate Index

F1

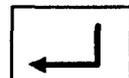
Press the function key F1 (INDEX) to obtain specific MC5 information about other items when in the help system.

A list with keywords will appear on the screen. The matching help text is available under the keywords.

Cursor keys

PgUP

PgDN



Press the cursor arrow keys to move the selection bar to a keyword.

Scrolling through the displayed keyword directory is done by means of the PgUp and PgDn keys.

Confirm the selection by pressing RETURN, the matching text will be displayed on the screen.

4.2 Enter your own Help Texts

The help system contains short explanations concerning the MC5 functions.

In some cases this text may either be too short or too long. The MC5 Programming Software has the possibility to adapt the help system text to your own needs. These changes can be made with the MC5 editor or any other ASCII-editor.

The file HELP.TXT contains the help text. In order not to alter the original file, it should be copied to the working directory under the same name (HELP.TXT). The changes should only be made to this copy only.

It is possible to create your own help texts by inserting a keyword in the index (HELP.TXT). These keywords are entered as follows:

@@@nnn NAME

Meaning:

@@@ = Marker for Help keyword (Index)
nnn = Help number from 1 to 99
(Each keyword number may be used only once)
NAME = Help Keyword (with a maximum of 50 Characters)

In the following lines the text is entered. You are not allowed to exceed the limit of 70 characters per line, otherwise it will not be possible to convert the text completely.

Ten lines per help page are available. However, the number of lines per page can be adjusted by control character Form Feed (ALT +12 in the numeric keypad).

After editing and saving the file, the new HELP.TXT file has to be converted, the MC5 Programming Software should be exited. Return to MS-DOS. During the conversion, the file HELP.S5 will be created. This is the help file which is used when MC5 is started.

The conversion program is run by entering the program name HELPCONV with the language parameter /E (for English). The execution of the program starts with the message "Conversion started ...":

```
C:\MC5»HELPCONV /E Conversion started ... Writing index table
```

The number of the help file being converted is also displayed on the screen:

```
Text 028 has 015 lines and max. 62 columns /offset: 00108154
```

The conversion program has ended when the following message is displayed:

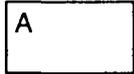
End of conversion !
nnn indexes were created !

In case an invalid help number (e.g. «1 or »999, or one which already exists) is used, the conversion is halted and an error message will appear. The new file HELP.TXT will remain unchanged.

5. Program Operation

5.1 Keyboard

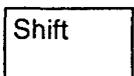
All functions of the MC5 Programming Software can be called up through a keyboard with a standard layout. There is no need for a special keyboard template. Standard MC5 features will be explained by using the function key descriptions. In this chapter, only the general key functions are explained briefly. The special keys of some computers have different functions.



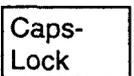
The alphanumeric keys (characters and numerals) can be used as usual.



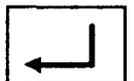
Extended key functions are available by using switch keys together with the alphanumeric keys. Switch keys are: the SHIFT, ALT or CTRL keys.



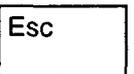
The SHIFT key has normal functions for writing (Capitals and special keys).



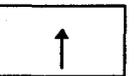
With the help of CAPS LOCK (or SHIFT LOCK) the keyboard is switched to type capitals continuously.



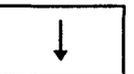
The ENTER (or RETURN) key generally has the function of "Start new line". A second function is to confirm commands entered (transfer commands/instructions to the program).



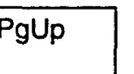
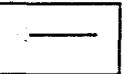
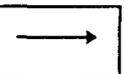
Press the ESC (Escape) key to cancel the execution of several commands. It also causes the return to the next higher level in the menu structure.



Some special keys have edit functions. These keys enable the user, e.g. to browse through the text, move the prompt, insert lines, insert or type over text, delete lines etc.

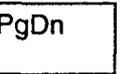


The cursor keys ($\leftarrow\uparrow\rightarrow\downarrow$) allow the cursor to be moved upwards, downwards, to the right and to the left.

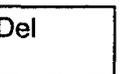


With the PgUp key in the editor menu, it is possible to return to the previous screen.

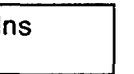
With the PgDn key, it is possible to call up the next screen. Press the



BACKSPACE key to delete the character left of the prompt



Press the DEL key to delete the character at the position of the prompt. Toggle the INS (insert) key in the editor to switch between two modes: "Insert" and "Typeover".



When a selection of multiple files is requested in the Directory Window, the insert key can be used as a toggle to tag or untag a file.

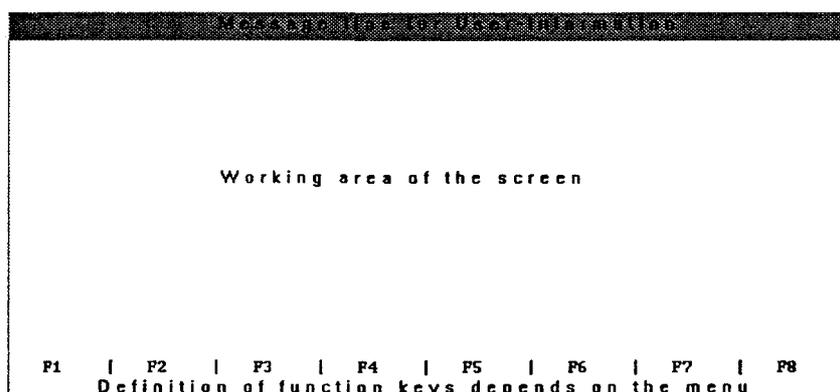
5.2 Screens

The Main Menu will be displayed on the screen when the program is started. All screen menus have an identical structure:

The upper section of the screen is used to display User Information (e.g. current menu, available memory, error messages) in a message bar.

The lower section of the screen is used to display function key symbols (F1 to F8) with their corresponding functions (menu dependent). Press one of the switch keys ALT or CTRL, to display another function key layout.

Screen layout



5.3 Entry-Windows

The MC5 Programming Software is user friendly: the program has been set up in such a way that entries for editing may be made with the aid of pop-up windows. Only the general use of the Entry-Windows is explained in this chapter.

While editing the entry field, the input (number of characters) can be longer than the entry-window. The characters will scroll horizontally through the Entry-Window. The cursor is always displayed.

Some special function keys can also be used in an Entry-Window:

HOME

- Press HOME:
The prompt will jump to the beginning of the line.

END

- Press END:
The prompt will jump to the end of the line.

—

- Press BACKSPACE:
to delete the character left of the prompt.

DEL

- Press DEL:
to delete the character at the position of the prompt.

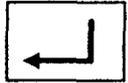
CTRL

- Press CTRL-END:
to delete all characters starting at the position of the prompt until the end of the line.

END

INS

- INSERT key:
When the insert mode has been selected, text can be inserted between two characters. When the typeover mode has been selected, existing text can be overwritten.



Press RETURN:
to confirm entries of filenames in the Entry-Window. If the filename does not contain a search path indication, the program will use the current directory (load from there or copy to it).

Other Entry-Windows, such as confirming questions for safety, can be answered by simply pressing Y or N (Yes/No). These windows will be used in various steps of the program. The function of these screens will be explained together with these program steps.

5.4 Cancel Commands, Quit Program

Cancel
commands

ESC is used to cancel commands.

ESC

Press ESC to discard all entries, commands etc. of the program. In order to exit program functions properly, use function key F10. When working in MC5, the function key F10 will usually execute the same command as ESC (e.g. quit program).

Quit program

F10

The user e.g. will be prompted to answer security questions, in order to prevent possible operating mistakes.

In practice this means:

- press ESC when a wrong function has been called .
- press F10 to exit when work with a particular function has been finished.

Quit Program (to exit MC5)

Press ESC or ALT- X from the Main Menu to exit MC5 and return to MS-DOS.

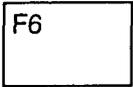
The user is prompted to save files for each of the buffers before exiting the program, and in the edit buffers are still files which have not been saved as yet. When finished or when there are no unsaved files in the buffers, the following question will be displayed:

!!! Attention !!! Are you sure you want to go back to

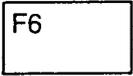
DOS (Y/N) ?

6. Preset Menu

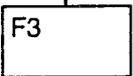
6.1 Keyboard Layout and Operation



Press function key F6 of the Main Menu to enter the menu Specials.



or



The Preset Menu is a submenu of the Special Menu (function key F6, "Preset"). In the Preset Menu, the function keys F3 - F8 will call up other screens. In this menu, all specific MC5 presets are defined. The presets are explained in chapter 6.2.

Attention:

The preset menu can be called up from almost anywhere in the menu structure. Just press CTRL and the function key P3 simultaneously.

Function Key Layout and Preset Menu

F1	Original	Calls up the last settings that have been saved.
F2	Save	Saves the presets.
F3	Drives	Configures the PG-Drives.
F4	On-line	Configures On-line Functions.
F5	Edit	Configures the Editor Settings.
F6	Symbolic	Configures the settings of Symbol functions.
F7	Print	Configures the printer parameters.
F8	Special	Defines special settings such as Language, Colors and Hardware.

ALT-key and Function key

F1	Help	Calls up the Help system
----	------	--------------------------

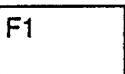
CTRL key and Function key

F4	System	Returns to the operating system
F8	Report	Prints the current presets

Loading the Presets

On starting the software, the presets are loaded from the MC5 configuration file MC5.CNF". A message will be displayed when this file is not available in the current or MC5 System directory. MC5 will then start with the default configuration.

Presets (this function calls up the settings last saved)



Preset values can be changed temporarily. The MC5 program will return afterwards to the previously saved preset values.

Save (this function saves new settings)

F2

Press F2 (Save) to save all changes to the preset values. This means that the values are saved in the file "MC5.CNF" of the current directory.

F10

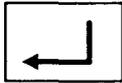
Press F10 (or ESC) to exit the menu when changes are made without using function key F2.

ESC

When ESC is pressed, changed settings will remain valid until exiting the program. If new settings have been saved, then the new ones will be loaded next time the program is started.

Function Operation

In order to change most settings, use the cursor keys to move the cursor to the corresponding field. Toggle RETURN to change the options.



Changes are made directly on the screen by overwriting or by opening Entry Windows after selection of same. Press RETURN. All entries in the Entry-Windows must be confirmed by pressing RETURN.

Use the Directory-Window function (see chapter 14.3) to enter a wildcard in a filename in the Entry-Window.

All filenames must be entered through the Entry-Windows. These filenames should meet MS-DOS standards (filename, max. 8 characters, and file extension, max. 3). Sometimes a search path (drive, directory, subdirectory) must also be entered.

6.2 MC5 Specific Settings

6.2.1 Preset: Drives FDO, FD1

F3

Drive A is always identified as the FDO drive, drive B as the FD1 drive.

PG drives must be assigned to the actual drives of the computer. You can select from:

- a 720-KB Drive (3,5") for PG635-Diskettes
- a 1,2-MB Drive (5,25") for PG685-Diskettes
- a 360-KB Drive (5,25") for PG675-Diskettes

Press RETURN to assign the corresponding drives. Of the same type, only one PG-drive can be selected.

User

When selecting the PG685/635-drive, the current user number (0-15) will be displayed. Toggle RETURN to change the user number until the desired number is displayed

Program File

When the PG685/635 drive is selected, the current program filename will be displayed. Enter the filename (up to 6 characters) to select the "S5D-file" on the PG685/635-diskette.

Move the cursor to the File name field and press RETURN. The entry window will be displayed. Enter the program filename, either directly or through the Directory-Window function (activated by pressing RETURN in the empty window). If at this moment no program filename is entered, the program will prompt to enter it the first time the PG635/PG685-diskettes are used.

Attention:
The Directory Window will only display the files of the current user. If the filename searched is not included in the list, the user number may have to be changed.

6.2.2 Preset: On-line

PC Interface

This option allows to select communication with the Programmable Controller via the MC5 Adapter (COM1 or COM2). The options selected depend on the installed MC5 hardware and the configuration of the computer.

On line

The function "On-line: Yes" or "On-line: No" determines the programming mode. It corresponds to the "On" or "Off" mode on the PG.

F4

When using "On-line" set to "Yes" upon exiting the preset screen, the program will test whether a connection can be made with a Programmable Controller. When the connection cannot be made an error message will be displayed and the mode will be switched to "On-line: No".

Addressing Mode

When selecting the addressing mode, a choice can be made between word and byte mode, meaning:

Byte: language set A on PG for PLC100U, PLC110S, PLC115U, PLC130WB, PLC150A/K.

Word: language set B on PG for PLC135U, PLC150S, PLC150U, PLC155U.

If "On-line: Yes" has been selected, the program will check (on exiting the preset screen) whether the selected range corresponds to the connected Programmable Controller.

Directory-Window

This setting relates to the Programmable Controller Directory-Window function. In the mode "Directory: Not extended", the Programmable Controller displays only the standard information. The setting "Directory: Expanded" displays besides the standard information also the block start addresses and the LIB-nr. If the Programmable Controller is fully occupied, this will take a long time. In that case, the option can be switched off.

Save to PC

When there is an On-line connection with the Programmable Controller, this option allows (in one action) Blocks to be saved from the Editor to both the hard disk and the PC (=PLC).

Online time-out

Maximum time for checking PC connection variable between 0 and 10 seconds in steps of 250 mSec. The infinit state can online be overruled by the Escape button.

EP interface

Selects communication port with the (E)EPROM. (COM 1, COM 2, Card-adapter).

6.2.3 Preset: Editor

F5

Representation

Blocks can be created in STL, CSF or LAD. If the Preset is configured for CSF or LAD, and a CSF/LAD Segment cannot be represented in CSF/LAD, it will be represented in STL. Use RETURN to select the Preset.

Automatic Compiling

When this option is set to "Yes", and the Block has been saved with "F2 Save", it will result in the creation of both an ASCII and a compiled ".MC5" version of the Block in the Editor.

Selecting "No" results in the creation of only the ASCII version of a Block when it has been saved from the Editor.

Overwrite Warning

On saving a file, a warning can be enabled to avoid overwriting an existing file of the same name on the target diskette or in the target directory.

Syntax Check

Press RETURN to make the selection. If "Syntax check: Yes" is selected, a syntax check is executed every time you leave an instruction line. Use the preset "Syntax check: No" to disable the Syntax checking.

Start of Comment

Here, configure the column number from which the Instruction Comment starts. Minimum=30 maximum=60.

Editor Mode

Select the edit mode with RETURN.

Editor mode **Insert:**

Starting at the cursor position, a newly typed character will be inserted in between two existing characters in the text. Already existing text will move to the right.

Editor mode **Overwrite:**

Starting at the cursor, a newly typed character will overwrite an existing character.

Press the INS-key to switch in the editor between the two options.

Data Format

Press RETURN to select one of the following default data formats: KH, KF, KS, S, KG, KT, KC, KY, KM. (See chapter 3.2.1.2 for details).

Default Operands in LAD/CSF

Depending on this option, default operands (e.g. I 0.0) or question marks (similar to PG's) will be presented when editing new LAD/CSF Segments.

Path for Temporary Files

MC5 creates temporary files. These files are automatically deleted when, following the correct Exit procedure, the program is exited .

Interval Autosave

Enter here a time interval from 0 to 99 minutes to save files that are currently being edited. A time interval of 0 disables the AUTOSAVE function.

If a time interval (e.g. 15 min) is entered in the Preset "Interval autosave", the last version of the files currently in the edit buffers will be saved in special AUTOSAVE files. These SAVE-files will be saved in the directory defined by the Preset "Path for temporary files".

When exiting the program, by using function key F10 (or ESC), the AUTOSAVE files will automatically be deleted. However, if a computer error occurs (e.g. system fault, power failure etc.), there is still the option to reload these AUTOSAVE files when restarting the program.

The files will be loaded from the same edit buffers as they were before the error occurred.

Attention! *If you have just saved a file. this file can be more up to date than the actual SAVE-file.*

The AUTOSAVE files created by the program have the filenames SAVE.001... SAVE.016, according to the corresponding edit buffers. It is possible to retrieve the status after a system error of the last AUTOSAVE, by confirming the question "Do you want to restore the AUTOSAVE files?" after a restart with "Y" (Yes).

The next step is to save these files under different names in the current directory. This is absolutely necessary because these files are deleted when MC5 is exited the normal way.

Example: Retrieving Autosave files

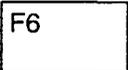
The MC5 Programming Software is installed in the directory MC5. Files have been edited in the buffers 2, 3 and 7. During the first execution of the AUTOSAVE function, the respective files SAVE.002, SAVE.003 and SAVE.007 will be created in the directory defined in the Preset. Proceed as follows to retrieve the AUTOSAVE files after a system error, which can be simulated by pressing CTRL-ALT-DEL at the same time or resetting the computer without exiting MC5:

- Boot the computer and start MC5.
The following message will be displayed: Previous program run was incomplete.
Do you want to restore the "Autosave files (Y/N)?"
- Confirm with "Y" (Yes).
The SAVE files are stored in the edit buffers, these were edited but not saved before the error.
- Save the files under another name (with their original name if desired) in the current directory, use the Edit Menu keys ALT/F2 (New Name).

After this, these files can be used as before.

6.2.4 Preset: Symbolic

Name of Symbols File



Enter the name of the file (sometimes with a search path) with the defined symbolic names. The Directory-Window function will be available after entering the characters " *.*"(see chapter 14.2).

The preset Symbol file" corresponds to the function of the SEQ"-file in the PG685/PG635 and in case of the PG675 to the function of the "Assignment list".

A Symbol file can be created with any ASCII editor e.g. the integrated MC5 editor. The file should have been created before its name is entered in the Preset. Upon exiting the entry screen, the selected file is converted to an internal format. If the conversion is free of errors, no error message will be displayed.

Errors in the Symbol file will be displayed when the Entry-Window is exited. The Preset "Use symbol file" is switched automatically to "No". Any mistakes in the Symbol file can be corrected using the editor. Save this file and select the option "Use symbol file: Yes" from the Preset Menu.

At each start of the program, the selected Symbol file is checked for changes. In case the ".SEQ"-file is more recent than the internal SYM"-file, the file will be converted again.

Use Symbol File

Press RETURN to select "Yes" or "No". The selection corresponds to the selected Symbol file. Preset "Yes" is only possible when an error-free Symbol file has been selected.

Symbolic Addressing

Press RETURN to select "Yes" or "No". Use symbolic addressing the same way as with the PLC Programming Software.

Preset "Yes"

By selecting "Yes", every operand will be replaced by its symbolic name when a symbol is present for this operand on leaving an instruction line. Every time the cursor is moved to another instruction line, the top line of the programming screen will show the current operand together with its associated symbol and comment (if available).

Preset "No"

Absolute operands will not be replaced by symbol names. Symbol names will be replaced by absolute operands whenever possible if not, a message will be displayed. Every time the cursor is moved to another instruction line, the top line of the programming window will show the current operand. It will also show the associated symbol and comment (if available).

Symbolic Save

Toggle RETURN to select "Yes" or "No". This setting is only valid when the option "Use symbol file: Yes" is selected.

Preset "**Yes**"

With this setting, Blocks are saved with symbolic operands instead of absolute operands. This function can be used for Rewiring" (re-addressing) Blocks by changing the addresses in the Symbol file, while keeping the Symbols in the file unchanged. The next time the Blocks are loaded/transferred, the Blocks will have new addresses. This option only affects the way the ASCII-file of a Block is saved.

Preset "**No**"

With this setting Blocks are only saved with absolute operands.

Listing Symbolic References

Toggle RETURN to select the options "After Segment" or "In Segment". This setting is only valid when the option "Use symbol file: Yes" is selected.

Preset: "After Segment"

A list with the used operands and symbols will be printed after each Segment. This list is arranged either alphabetically to symbols or to operands (according to the Preset "Symbolic addressing").

Preset: "In Segment"

A list with the used operands and symbols will be printed next to each Segment. This list is arranged either alphabetically to symbols or to operands (according to the Preset "Symbolic addressing").

6.2.5 Preset: Print**Title Block**

F7

Select this option with the cursor keys and press RETURN to display an Entry-Window. Enter the filename to load the text and structure of the Title Block. The Directory-Window function can be used (see chapter 14.2). The Title Block file is an ASCII-file. It can be created with any text editor (see chapter 8.3.6.). The Title Block will be printed at the start of every page.

Apply Title Block?

Toggle RETURN to select "Yes" or "No"

Preset "Yes"

The Title Block will be used during the print-out.

Preset "No"

The Title Block will not be used during the print-out. The filename, print date and the page number are printed in the default Title Block structure.

Page Footer File

Select this function with the cursor keys and press RETURN to display an Entry-Window. Enter the filename from which the text and structure of the Footer should be loaded. The Directory-Window function can be used (see chapter 14.2). The Footer file is an ASCII-file, it can be created with any text editor (see chapter 8.3.6). The Footer is printed at the end of each page.

Apply Page Footer?

Toggle RETURN to select "Yes" or "No".

Preset "Yes"

The Footer file will be printed.

Preset "No"

The Footer file will not be printed.

Attention:

Create an empty file when no Title Block is wanted. Enter this filename as the Title Block file and select the preset "Use header file: Yes".

Lines per Page

With this option the length of a page is defined in a number of lines per page, which can be from 30 to 255 lines per page.

Characters per Line

This option allows switching between Normal print (80 characters per line) and Compressed print (132 characters per line). When Blocks are printed in Normal print and the Symbolic is activated, the Symbolic Reference List is printed immediately after the corresponding Segment. Instruction Comment will be cut off because of lack of space.

When Blocks are printed in Compressed print and the Symbolic is activated, the printing of the Symbolic Reference List will take place according to the Preset, either next to or underneath the corresponding Segment. Enter the appropriate control codes in the Print Preset "Printer initialization" to use compressed print, as these codes are printer dependent.

Left Margin

This preset allows to define the starting position of the print-out, from 0 to 30.

Printer Initialization

Select this function with the cursor keys and press RETURN to display an Entry- Window. Enter the printer codes that should be sent before the printing is started, e.g. to set the printer to a compressed printing mode (132 characters per page/line).

If more codes are to be entered, these have to be separated by spaces or commas (",").

Example: Initialization code for EPSON FX80 printer:

Printer initialization: 15

Printer Reset

Select this function with the cursor keys and press RETURN to display an Entry-Window. Enter the printer codes that should be sent to the printer at the end of the print procedure.

Example: Reset code for EPSON FX80 printer:

Printer reset 27,64

Use of Printer Controls

Use preset "Yes" if the printer is to be initialized or reset before or after the print operation. The preset "No" will use the current settings of the printer.

Use of IBM-Graphics in CSF/LAD

If the printer supports IBM-Graphic characters, set this option to get a listing of higher quality in CSF/LAD.

Printer Device/File

Select this option and press RETURN. Select the parallel port connected to the printer (LPT1, LPT2 or LPT3). If the "Diskette" option is selected, a file "MC5.PRN" will be created. This file contains the formatted data and can be used later on for background printing, using the MS-DOS command "PRINT".

If the file MC5.PRN" already exists, the user is prompted to overwrite or append it to the existing file.

6.2.6 Preset: Special**Language**

F8

Toggle RETURN to select the German or the English version of MC5. If the language is changed, save the configuration first and restart MC5 before it will become effective.

The language may be selected when calling up the MC5 program. To use the English version, type 7e" behind the "MC5" command at the DOS-prompt:

```
C:\MC5 /e
```

To use, e.g. the German version, run the program by typing the language code at the DOS-prompt:

```
C:\MC5 /g
```

Colour Settings

Colours can be preset for every type of screen of the MC5 Programming Software. Select the screen items with the PgUp and PgDn keys. To change the colours of a selected item, move the cursor keys through the colour field. The colour at the position of the cursor is the one chosen. Use F7 and F8 to select the default configuration for Laptop computers (EGA/VGA emulation) and Toshiba Laptops.

Use XMS memory

Set to "Yes", MC5 is configured to use XMS-memory. When this option is changed, this preset has to be saved and MC5 has to be restarted to make the new configuration effective (see chapter 2.7).

Attention:

If there is a problem with colour presentations, set the monitor adapter to black/ white mode using the DOS command "MODE BW80" before starting MC5. Then select the colours and save the configuration.

Cursor Problems

If there is any problem in displaying the cursor, set "Cursor Problems" to "Yes". The default system cursor will be used and always be visible (see chapter 2.7).

Video Problems

If the video mode should not be changed by MC5, set the "Video problems" option to "Yes" (see chapter 2.7).

Show Project name

in stead of showing the free memory of the PC and the name MC5 on top of the screen.the project name can be shown by changing this option to yes.

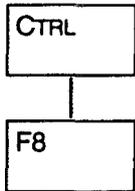
Generating an ASCII-file

With this option set to "Yes", besides creating a compiled version of a Block in MC5, it will also generate an ASCII version when transferring Blocks from PC (=PLC) or CP/M-diskette to the hard disk.

Log transfer of Blocks

Set to "Yes", the progress of the Block transfer operation is followed and logged in a file. Whenever an error occurs, the name of the erroneous file and the corresponding message will be entered in the file "MC5.LOG".

6.2.7 Preset: Report



Press CTRL and F8 (Report) simultaneously to print a screen containing all current presets,. This report also contains some of the system constants on which the user has no influence.

Attention:
A complete report of the Presets is sent to the selected printing device. This is not necessarily the printer. It could also be the hard disk.

7. Main Menu

7.1 Function Key Layout and Menu Branching

All menus can be called up through the Main Menu. Important functions can be executed immediately via the submenus, e.g. calling up Help Menu, Preset Menu or to return to the MS-DOS command level. The following pages give an overview of the Menu structure.

Function Key Layout Main Menu

F1	Project	selects the Projectmanager
F2	Editor	selects the Editor
F3	Compare	compares the function
F4	Transfer	selects the transfer menu
F5	Delete	selects the delete menu
F6	Special	selects the special menu
F7	Info	selects the Information menu
F8	Test	selects the Test menu

ALT Key and Function Key

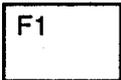
F1	Help	calls up the Help system
----	------	--------------------------

CTRL Key and Function Key

F3	Preset	selects the Preset menu
F4	System	returns to the Operating System

7.2 Menus

Selecting the Project Management Menu.



Select the Project Manager with F1 (Project).
When the Project Manager is selected, the following functions are displayed in the Key Bar.

Function Key Project Manager

F1	Sel.Proj.	Selects the marked project
F2	Save	Saves the current presets
F3	Rename	Renames the marked project
F4	New Proj.	Creates a new project
F6	Comment	Edits comment with the project
F8	Quit	Quit the projectmanager

ALT Key and Function Key

F4	Delete	Deletes the name of a project
----	--------	-------------------------------

CTRL Key and Function Key

F3	Preset	Selects the Preset menu
F4	System	Returns to Operating System

Creating a new project

If you want make a new project, press F4 (New Pro].). The following menu is displayed in the key bar.

F1	Continu	Continues with creating Project
F3	Ch. Drive	Changes the drive for the new Project
F4	Make Dir	Creates a new directory
F5	Rem. Dir.	Removes an empty directory
F8	Print	Prints the directory box

A directory box is also displayed on screen. In this box you can move to a directory in which you want to create the new directory. When making the new directory, another drive can be selected by pressing F3 (Ch. Drive). Press F4 (Make Dir.) and a small box is displayed asking for the name of the new directory. Enter the name and press <Enter>. The new directory is now a subdirectory of the one you where when the F4 (Make Dir.) button was pressed.

If F1 (Continu) is pressed, another small box is displayed asking for the name of the new project. Enter the name and press <Enter>. The lenght of the name can be 19 characters.

When the name of the new project or any other project is not correct, this can be changed at any time by pressing F3 (Rename) in the Project Manager Main menu. Make sure that the project you want to change is marked.

Comment can be added or edited by marking the project and press F6 (Comment). The comment can be 16 lines long with 80 characters per line. After editting the comment press F6 (Accept) or F8 (Cancel) to accept or cancel the new comment.

Deleting a project/directory

Project

When you want to delete a projectname, make sure that the project is NOT selected as default. Only projects that are not selected as default but are only marked by the marker line can be deleted. When a mistake is made, the deleted name can be restored at any time by creating a new project in the directory in which the old one was deleted, e.g. create a new project in the directory TEST when the deleted project was in the TEST directory.

MC5 will recognize that there was a project in this directory and create it again. This is done by a special file in the directory, called the *.PRI file. Only when this is deleted from the directory the projectname is permanently lost.

Directory

When you want to delete a complete directory, make sure that the directory is empty. This can be done by emptying it with the Main Menu's Delete function. The reason for this is that MC5 is a DOS based program and DOS itself can't delete a filled directory.

Remove it by moving to the directory in the F1 (Project)-F4 (New Proj.) menu, selecting the correct directory and press F5 (Rem. Dir.).

Of course when you have deleted the whole directory, the project that was in it can't be brought back because you have deleted the *.PRI file.

Selecting the Editor Menu, Load File (Chapter 8, 9 ,10)

F2

Select the Editor Menu F2 (Editor). From here on you can load an existing block or create a new one. For further functions see chapters 8, 9 and 10.

Selecting the Compare Function (Chapter 7)

F3

F3 compares the contents of selected Block pairs. The result of the comparison between two sources is written to a file. It can be displayed as well as printed. The comparison is aborted when more than 30 differences are detected. The next pair of Blocks will then be compared. After selecting the Compare function a selection can be made, e.g. F1 Create, F2 Browse and F3 Print.

- F1 Create
Press P1 Create to start a comparison. The user is prompted to enter a filename to store the results (SPS Block names are not allowed). Next, select either two Blocks or a group of Blocks to be compared (use the Directory- Window function, see chapter14.2.1).

Multiple Blocks from one source can be selected for comparison with Blocks (with identical names) from another source. However, Blocks can only be compared from a single directory with Blocks from another single directory or device.

- F2 Browse
Press F2 Browse to examine the result of the comparison.
- F3 Print
Press F3 to print the result of the comparison.

Selecting the Transfer Menu (Chapter 11)

F4

F4 selects the Transfer menu, which contains the following:

- S5D-File functions: to pack, unpack or copy a PLC program file created under MS-DOS or S5-DOS (F1 S5D-File).
- SEQ-File functions: to convert a PLC Symbol file, created under MS-DOS, to an MC5 Symbol file and vice versa. It also transfers an MC5 Symbol file to and from an S5-DOS diskette (F2 SEQ-File, see chapter 11)
- Copy function to copy diskettes in PG format (F3 All)
Transfer function to transfer Blocks (F4 Blocks).

Attention:

If in the blocks, to be compared, symbolic addressing is used, the related Symbol file must be selected in the Preset.

Selecting Delete Menu (Chapter 12)

F5

- F5 will delete a Menu, which will allow/ to:
- clear a Programmable Controller (F1 PC)
 - delete entirely a PG675-diskette (PG675)
 - delete a program file (PG685 or 635)
 - delete a Block (F5 block)

 - delete an EPROM (F7 EPROM)
(see chapter 12).

Selecting Special Menu (Chapter 13)

F6

- F6 (Special) selects the Special Menu, which allows to :
- start the PC (F1 start)
- compress the PC-memory (F2 Comp)
- stop the PC (F4 Stop)
- preset the Menu (F6 preset)
- format a diskette in PG format (F7 format, see chapters 13 and 6).

Selecting info Menu (Chapter 14)

F7

- F7 selects the Information Menu, which contains:
- Creation of a Cross Reference list (F1 XRF)
 - Directory-Window Function (F2 Dir)
 - Documentation Menu (F3 Doc)
 - Memory Information (F4 Mem.Size)
 - Interrupt Stack (F5 I-stack)
 - Block Stack (F6 B-stack)
 - System Parameter (F7 Syspar)
 - Address Menu (F8 Address, see chapters 14 and 16)

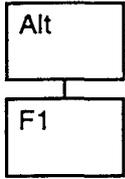
Selecting Test Menu (Chapter 15)

F8

- F8 selects the Test Menu, which contains the following:
- Control Variables (F5 Cntr.Var)
 - Control Outputs (F6 Control)

 - Status of Variables (F7 Stat.Var)
 - Status of Blocks (F8 Status)

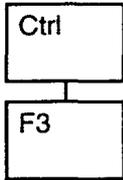
Selecting Help system:



Press ALT and F1 (Help) simultaneously to call up the Help System.

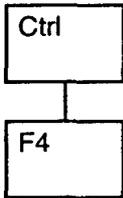
Explanations concerning the current menus are inserted. Other help screens can be called up from this menu. The Help System is explained in chapter 4.

Direct Selection of Preset Menu:



Press CTRL and F3 (Preset) simultaneously to call up the Preset Menu immediately without entering the utility menu.

Shell to MS-DOS Command Level:



Press CTRL and F4 (System) simultaneously to return to the MS-DOS SHELL (command level).

This action interrupts the MC5 Programming Software. MS-DOS commands can now be entered. The MC5 will remain in memory (Background). Enter the word "EXIT" and press RETURN to return to the MC5 system. It even returns to the menu left previously.

Attention:

This funktion requires at least 64 K of free memory otherwise the MS-DOS SHELL cannot be used.

8. STL Editor Menu

8.1 Loading and function key lay-out List of editing functions

Main Menu

You can activate the editor menu from the Main Menu by pressing function key F1 (Input) or F2 (Output).

F1

In the MC5 programming package these functions are identical.

F2

When you press the function key F1 or F2, the following screen will be displayed:

**EDITOR
screen with
FB**

```

015-85 125176 Bytes free  EDITOR MENU
BLOCK#FB222
BLKNAME #NAME          <OF MAX. 8 CHARACTERS>
LIB #25054
; additional documentation line
0000A : COMMENT
0000C :L RI 190 CONST. PFCB
0000E :LIR 12 SAVE VECTOR
00010 :TIR 0 SET VECTOR
00012 :LIR 1
00014 :T RJ 252 DW0 NUM. ELEMENTS 1..511
00016 :L RI 190 CONST PFCB
00018 :LIR 12 SAVE VECTOR
0001A :TIR 0 SET VECTOR TO 0
0001C :L RI 173 CONST E005
0001E :LIR 1 FIND HIGHEST BIT
00020 :T RJ 252 NR.
00022 :FDG BIT NR.
00024 :T PD 251 COUNTER 1,2,4,8,16..128
00026 :L KB 1
00028 :BE
    
```

F1 Load	F2 Save	F3 Search	F4 Replace	F5 Repeat	F6 Mark	F7 Blk. Copy	F8 Print
------------	------------	--------------	---------------	--------------	------------	-----------------	-------------

The available memory and the menu name are displayed in the message line of the screen. This message line contains the following information:

- current position of the cursor (line and column). With Blocks the relative line number in the current Segment
- the current Segment number
- the edit mode and the file type ("Insert" or "Overwrite", "Text file" or In case of the Blocks "Syntax check".)
- the current edit buffer (#01).
- marker to indicate if the file was edited since it was last saved (character *).

Editor menu of Function Keyboard Layout

F1	Load	Loading a file from harddisk, diskette, programmable controller, or EEPROM
F2	Save	Save the current file
F3	Search	Move cursor to the search argument
F4	Replace	Replace search argument by other argument
F5	Repeat	Repeat Search function or Replace function
F6	Mark	Mark the block in the current block
F7	Copy blk.	Insert block from memory at the position of the cursor
F8	Print	Print the current file or the marked block

Alt key and Function key

F1	Help	Activate help system
F2	New name	Save the tile under a new name
F3	Blk.Wrt.	Write the saved block as a MS-DOS file
F4	Blk.Read	Move the block to the cursor position
F5	Blk.Del.	Delete marked block
F8	Clear Bf.	Remove a file from the editor range (working memory)

Ctrl key and Function key

F1	Compile	Compile the file currently loaded in the editor
F2	Update	Format the file currently loaded in the editor
F3	Preset	Activate the preset menu
F4	System	Shell to Operating system
F6	Sym	Activates Symbols Window with a list of the Operands, their Symbols and Descriptions of the current segment.
F7	LAD	Change to Ladder editor
F8	CSF	Change to Control Statement Flowchart editor

List of editor functions

Cursor positioning

Ctrl-S	←	Cursor one character to the left
Ctrl-D	→	Cursor one character to the right
Ctrl-E	↑	Cursor one line up
Ctrl-X	↓	Cursor one line down
Ctrl-A	Ctrl ←	Cursor one word to the left
Ctrl-F	Ctrl →	Cursor one word to the right
	Ctrl- ↑	Cursor one paragraph up
	Ctrl- ↓	Cursor one paragraph down
Ctrl-I	Tab	Cursor tab right Cursor jumps one tabulator position to the right
	Shift-Tab	Cursor tab left Cursor jumps one tabulator position to the left
	Home	Cursor to line begin Cursor jumps to the beginning of the line
	End	Cursor to line end Cursor jumps to the end of the line
Ctrl-Q R	Ctrl- PgUp	Cursor to file begin Cursor jumps to the beginning of the file
Ctrl-Q C	Ctrl- PgDn	Cursor to file end Cursor jumps to the end of the file
Ctrl-Q E	Ctrl- Home	Cursor to screen begin Cursor jumps to the beginning of the screen
Ctrl-Q X	Ctrl- End	Cursor to screen end Cursor jumps to the end of the screen Cursor positioning (continued)
Ctrl-Q B		Cursor to block begin Cursor jumps to the beginning of a marked block

Ctrl-Q K		Cursor to block end Cursor jumps to the end of a marked block
	Alt ←	Scroll left Cursor stays at the same position of screen: the text moves one character position to the left.
	Alt →	Scroll right Cursor stays at the same position of the screen; the text moves one character position to the right.
Ctrl-W	Alt- ↑	Scroll up Cursor stays at the same position of the screen; the text moves down line by line (to begin of file).
Ctrl-Z	Alt- ↓	Scroll down Cursor stays at the same position of the screen; the text moves up line by line (to end of file).
	Alt- PgUp	Page left Cursor stays at the same position of the screen; the text moves one screen page to the left.
	Alt- PgDn	Page right Cursor stays at the same position of the screen; the text moves one screen page to the right.
Ctrl-R	PgUp	Page up Cursor stays at the same position of the screen; the text moves one screen page up.
Ctrl-C	PgDn	Page down Cursor stays at the same position of the screen; the text moves one screen page down.

File/Block handling

	Alt-1 to Alt-9	Switch to buffer nr...
	Alt-0	Internal directory
	Alt-F8	Clear buffer
	Alt-X	Leave editor, buffer cleared
	Esc	Leave editor, buffer uncleared
Ctrl-K-Q	F10	Leave editor, buffer cleared
Ctrl-K-B	F6	Begin of block
Ctrl-K-K	F6	End of block
Ctrl-K-W	Alt-F3	Write block A marked block is saved on the hard disk under a user definable name.
Ctrl-K-R	Alt-F4	Read block A saved block is inserted at the position of the cursor.
Ctrl-K-C	F7	Copy block A marked block is copied to the position of the cursor. The operation can be repeated within the same Edit Buffer.
Ctrl-K-Y	Alt-F5	Delete block A marked block is deleted from the text. The block can be inserted again in the text at the position of the cursor.
Ctrl-K-V	Alt-F6	Move block A marked block is deleted and inserted at the new cursor position.
	F2	Safe file The original file is updated with the current status of the Edit Buffer.
Ctrl-K-S	Alt-F2	New name The original file stays intact.

Edit functions

Ctrl-V	'Ins	Change edit mode (Insert/Overwrite) Switch between: Insert = new text is inserted at the cursor position. Overwrite =existing text is overwritten with new text.
Ctrl-Q-Y		Delete till end of line Starting at the cursor position, text is deleted until the end of the line.
Ctrl-Q-Z		Delete till begin of line Starting at the cursor position, text is deleted until the beginning of the line.
Ctrl-H	Back space	Delete left character The character left of the cursor is deleted.
Ctrl-G	Del	Delete character The character at the position of the cursor is deleted.
Ctrl-N		Insert line A new line is inserted under the current line.
Ctrl-Y		Delete line The current line is deleted.
Ctrl-Q-F	F3	Search text Starting from the position of the cursor the program will search for an entered text string (max. 31 characters). The function can be Repeated.
Cftrl-Q-A	F4	Replace text Starting from the position of the cursor the program will search for a specified string and replace it with an other text. The function can be Repeated
Ctrl-L	F5	Repeat Repeats the functions 'Search text and 'Replace text'.
	Alt-E	Force line-break when syntax check is on

8.2 Files, Block editing

8.2.1 Create a new file

The MC5 programming package offers you editorial comfort while creating and editing Blocks.

In Addition to the program editing, you can create plain text files. The operation is very much compatible with the WordStar Editor.

After having activated the editor, you can begin creating a new Block or text file.

If you have selected the function "Syntax check:Yes" from the preset menu (see chapter 6.2.3), and if you subsequently enter a valid Block identifier in the first line as an instruction.(e.g.: BLOCK#DB7 or BLOCK#FB70) the program will recognize that all the following entries belong to PLC-programs. The program will automatically create a text file, when you selected the option "No" from the preset menu, or when you entered anything else in the first line.

8.2.2 Editing MC5 Blocks

After entering the Block identifier and leaving the line by pressing the RETURN key (or the cursorkeys PgUp or PgDn), the program will automatically perform a line check. The cursor will jump to the next line when the Block identifier is correct.

In every next line, you can enter commands according to the PLC conventions.

Instruction lines

An instruction line in the MC5 programming package has the same structure as the one in the PG. The line however is extended by offset addresses at the beginning of the line, which are automatically set by MC5. You should not include or change this offset yourself, because the program uses a fixed form for this. The increase depends on the setting in the Preset Menu addressing mode:byte/word wise) and from the instructions in the previous lines (Increase by one in case of one-word instructions, increase by two in case of two-word instructions).

Example:
structure of an
Instruction line

Offset address	Label address		Instruction	Comment
00009	LOOP	:	L FW 254	Loop counter

The jump address, marker, instruction and comment have basically the same function as with the programs that have been created with a PG. In addition to automatic Address assignment MC5 offers you the following improvements:

- You can enter unformatted program lines. After you have left the line, it is displayed formatted in accordance with the program scheme.
- The semicolon character ;) at the beginning of a line indicates a documentation line which can be written in between the instruction lines. If the cursor is located immediatly right from the colon the documentation line can be started by pressing the Backspace key. Additional comment at a program line begins at column 30.

A syntax check is performed upon leaving the program line (see Preset menu chapter 6.2.3.). One can not leave the line in case there are invalid entries. Then the cursor will jump to the invalid entry.

8.2 3 Leaving the editor menu.

Esc

If you want to interrupt the editing only temporarily, press the Esc-key. You will return to the main menu.

In order to continue working with the editor, activate the editor function by pressing function key F1 and if applicable change to the edit buffer (see chapter 8.2.4).

F10

If you want to leave the editor altogether, press the F10 function key. When you did not save edited tiles, the following question will be displayed on the screen.

Save file
01#FB3 save (Y/N)?

Esc

This question contains the digits for the corresponding editor range (01 ...16), the file names and a Yes/No-question. Esc allows you to abort the function and return to the editor.

N

When you press the character key N (for No), the file will not be saved.

When you answer the question by pressing the character key Y (for Yes), the tile will be saved under the name displayed in the window.

J

In case no file name exists, a second window will be displayed, in which the file name must be inserted (including a search path when necessary). If a search path was omitted, the file will be saved in the current directory.

Blocks:
Only Block names
e.g.FB100,
DB3

Write to
-

After pressing RETURN, the file will be saved under the entered name.

Attention:
MS-DOS Files:
Names with a maximum length of 8 characters and an extension of 3 characters separated by a period.

If you have entered the name of a file which already exists, the following question will be displayed:

Save Block
 FB3 exists, overwrite (Y/N)

Esc

Esc enables you to abort the function and return to the editing.

N1

By pressing the character key N (for No), the existing file will not be overwritten, and the current file will be removed from the editor without being saved.

J

By answering the question affirmatively, the existing file will be overwritten.

8.2.4 Allocate other Edit Buffers

Alt

The editor offers the possibility to allocate up to 16 buffers for file editing purposes.

You can create new files or load existing files from diskette, harddisk, programmable controller or EEPROM.

0

After you pressed the key combination Alt-0 (i.e. Alt key and zero key simultaneously), the list of the current editor buffer will be displayed.

PgUp

PgDn

File name	Area	Autosave	Bytes
FB222	#01	12:54:33	958
FB10	#02	14:59:14	466
	#03	12:54:30	0
	#04	12:54:30	0
	#05	12:54:30	0
	#06	12:54:30	0
	#07	12:54:30	0
	#08	12:54:30	0
	#09	12:54:30	0
	#10	12:54:30	0
	#11	12:54:30	0
	#12	12:54:30	0
	#13	12:54:30	0
	#14	12:54:30	0
	#15	12:54:30	0
	#16	12:54:30	0

You can select another editor buffer, by moving indicator to the desired buffer (cursor keys and) and confirm this by pressing the RETURN-key.

Alt

8

The editor range 01 to 09 can be activated immediately, by pressing the Alt key together with one of the keys 1 ..9 of the alpha-numerical keyboard.

8.3 Editor functions by means of function keys.

8.3.1 Functions: Load a file, remove a file

F1

The function "Load" (F1) allows you to load a file from harddisk, diskette, the Programmable Controller, or from the EEPROM in the current buffer of the editor. After pressing the function key, the following window will be displayed:

Attention:
In case the error message "unknown device" is displayed, please check the preset "drive(s)".

Load file:

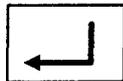
-



Please enter the desired name in the window (File name e.g FB22 or TEST.TXT) and confirm this by pressing the RETURN-key. If the file is not to be loaded from the current directory, you must enter a search path, e.g.:

Loadfile:

C:\FIRMSEGMENT\NW-SLAVE\FB22



For selecting a file you can also use the Directory function (see chapter 13.3), by confirming the empty window pressing the RETURN-key to display the current directory. If you want a selected display of the files, make your selection by entering wildcards in the entry window (e.g. ?B* to display all the Blocks) and confirm this by pressing the RETURN-key.

In case the current edit buffer already contains a file, it will be overwritten. When you have made changes to this file and have not saved it yet, you will be asked the regular questions for saving the file (see chapter 8.2.1).

When loading a Block from programmable controller or from EPROM it will be combined with a file from hard disk/diskette with the same name. During this process the Block Header, Comment and Documentation of the corresponding Block will be re-loaded. In case inconsistencies are met in the

Alt

program code one is asked if reloading from hard disk/diskette should occur or not.

If you want to clear an edit buffer, you should use the function "Clear Buf" (Key combination Alt and F8).

F8

The current buffer will be cleared. The request for conformation follows also with this function.

Save file before quitting

01#FB3 to be saved (Y/N)?

While editing you have two edit statuses at your disposal:

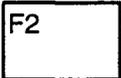
- the current edit status of the files which were loaded in memory. This status is at your disposal, if you select the proper edit buffer.
- the edit status on harddisk, diskette, EEPROM or in the programmable controller, which comes available by using the Load function and entering the file name (including the search path if necessary). To load a file you may use the Directory function. This status is not overwritten until the buffer is saved (function key F2 or after positive confirmation of the question to save the Block).

When you want to replace the edited file with the original file from disk, activate the Load function by pressing P1 and answer the question "Save file" with 'N' (for No).

8.3.2 Functions: Save, new name, compile.

Save file

You have the possibility to save the current edit status anytime you like. The function "Save" will overwrite the former file status with the new status of the file in the current edit buffer.



Function key F2 allows you to activate the saving procedure. The corresponding message will be displayed in the message line. With saving to PC/EPROM you will be asked to confirm if the Block should also be saved on disk in case a Block with the same name already exists on harddisk/diskette.

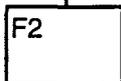
Attention!

The function "Autosave" (see chapter 6.2.3) will not update the original file. The program will create a special backup file.

New name



The function "new name" is activated by pressing the keys Alt and F2 simultaneously. On the screen the corresponding Entry Window ("write to") will be displayed.



Enter the new file name (if appl. with search path) and confirm this by pressing the RETURN-key. During write operation, the corresponding message is displayed. When the file name already exists, the regular request to confirm to overwrite the file will be displayed.

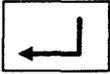
The status The status of the original file will stay unchanged. The current file will be saved under its new name and will be available for editing under this name.

8.3.3 Functions: Search, replace, repeat

Search

F3

The function "Search" allows you to move the cursor to the first character of a search definition. When you press the function key F3, the following entry field will be displayed:



Searching for...

-

Enter the search definition and confirm this by pressing the RETURN-key. (Pay attention to the exact notation, regarding used blanks).

The entered character string will be searched for from the cursor position onwards until the end of the text. The cursor will jump to the first character of the search definition that is found. The last entered search definition will remain default in the Entry Window. The search function can be repeated by using the function "Repeat" (function key F5 "Repeat").

Option:

With the Search function you have the option to search case sensitive or insensitive (i).

Replace

The **function Replace** allows you to expand the "search" function and replace a character string for another.

F4

When you press function key F4, the following entry field will be displayed:



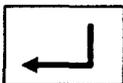
Enter the search definition here, which is to be replaced by another definition (pay attention to the exact notation). After confirming the search definition by pressing RETURN, the next question will be displayed:

Searching for...

-

Replace with...

-



Enter the definition that has to replace the searched definition. When you press the RETURN-key at this point, the entered character string is searched for, starting from the position of the cursor to the end of the text

Y

The cursor will be positioned on the first character of the first found text that corresponds with the search definition. In the message line the question "Replace Y/N?" will be put.

If you want to replace the definition, press the Y key (for Yes).

N

If you do not want the original character string to be replaced by the search string, press the N key (for No).

The last entered character strings will remain default. This function can also be reactivated by pressing the function key F5 (function key F5 Repeat").

F5

Options:

With the Replace function you have the following options:

g: Global search and replace (search for all occurrences of the search-text).

i: Search case insensitive.

n: Do not ask for confirmation to replace text.

A combination of these options is possible: _____

Options (g/i/n)
i/g

8.3.4 Function: Mark

F6

Function key F6 (Mark, Mark End, Mark Erase) allows you to mark a range of a Block for editing purposes later on. (e.g. copy, print, insert etc.).

F6

Move the cursor to the first character to form the beginning of the range. By pressing the function key F6 you mark this position. F6 is switched to the function "Mark End", the text of the key will change accordingly (Mark End).

F6

Move the cursor behind the last character of the desired block. By pressing the function key F6 again, you mark the end of the block. The selected range is displayed in inverse characters. F6 will switch to the function "erase marking", the text of the key will change accordingly (Mark Erase). When you press the function key F6 once more, the marking of the block disappears.

8.3.5 Block functions (Copy, write, load, delete)

Using the Mark function MC5 offers you the possibility to mark a block of text. In this way you can e.g. copy part of a routine within the same Block or save these blocks as single MS-DOS files in your working directory and load them again (also in other files). If you want to delete extensive parts of the program, you can speed this up by using the function "delete block".

Function "Copy block"

F7

Function key F7 enables you to insert a formerly marked text block at the current cursor position, the block will remain at the original position. This command can easily be repeated within the range of the editor.

Function "Write block"

Alt

In order to save a block as a MS-DOS file (write it as a file), press the keys Alt and F3 ("Bl. Wit") at the same time.

F3

A screen will be displayed in which the DOS file name can be entered. After having pressed the RETURN-key, the block will be saved under the name you just entered in the current directory and can be loaded by using the function "read block" (keys Alt and F4 "Bl. Read").

Function "Read block"

Alt

The function "read block" enables you to load a file at the current cursor position.

F4

When you press the key combination Alt and F4 simultaneously in the editor menu, the screen will display the entry window of the file name. You should enter the name of the file you wish to edit (together with the search path or use the "directory function", see chapter 14.3). After confirmation by pressing RETURN, the block (file) will be inserted starting at the current cursor position.

Function "Delete block"

Alt

The function Alt F5 enables you to delete an entire block, which has been marked

F5

previously by means of the F6 function, and will copy the block at the same time to the memory.

The deleted block can be inserted at the current cursor position by using the function "insert block" (keys Alt and Ins).

Alt

When you use this function more than once, the block will be inserted again and again. The text will remain in the memory, until another function has been selected or until you have left the editor menu.

Ins

8.3.6 Function: Print

F8

The function "Print" (F8) enables you to copy the current status of a file to an output device at any time. The print-out depends on the presets:

- Print (see chapter 6.2.5.)
- Symbolic (see chapter 6.2.4.)

Attention!

You can switch to the preset menu, by pressing the Ctrl key and the function key F3 simultaneously.

Create Title Blockfile and Footerfile:

The text that has to be printed in the Title Block (or Footer), must be written in separate MS-DOS files. These files are ASCII- files that can be created with the text editor. The Title Block or Footer files may not exceed the limit of 254 characters/lines. However, only the first 10 lines, limited by 132 characters per line, are printed.

If you want to create a Title Block file to use with different programs and print the file name, current date and page number of the file being printed, you can make these three items generally usable by preceding the keyword (in capitals) with three "at" characters (@ @ @), i.e.:

@@@FILE

(The current file name is printed, E.G.:

File: FB123

File:C:\TEST\PB3

@@@DATE

The system date is printed in this line. (Please check whether the system date agrees with the current date.)**Example:**

The Title Block file contains the following text, e.g.:

Date: 21.01.1992 Project: 911203-SFile:
C:\911203\FB123

@@@PAGE:

The current page number is printed e.g.:

Page:001

If you select "NO" for "Apply Title Block" in the Print Preset Menu, the default file name, date of printing, and page number will be printed at the beginning of each page. If you do not want this option you should create an empty Title Block file, select the file and choose "YES" for "Apply title block".

Printing part of a file

F8

If you only want to print a part of the current file, you mark this part by using the function "mark" (F6, see chapter 8.3.4). After pressing the function key F8 "Print", only the marked block will be printed.

In case you have not marked a block, the current file will be printed completely, the corresponding message will be printed in the header. If you are editing in CSF/LAD pressing F8 results in a print-out of the current segment. A print-out of a complete Block can be obtained using the function Doc (F7, F3, see chapter 14.4).

8.3.7 Function: Compile(Compilation of files into PG-format)

Ctrl

When you press the Ctrl key and F1 function key at the same time, the compilation of the source codes is started.

F1

The compilation of the source code will be done according to the MC5 compile conventions (see chapter 17). The message line will display the corresponding messages.

If the program contains an error, the compil operation is aborted and the cursor will Jump to the incorrect expression. A corresponding error message will be displayed in the message line.

During compile and write operations to PG-diskette, additional comment lines (DOC- lines starting with the semicolon character (;)) will be saved in a Documentation Block and will become available again during the read operation of the PG-diskette.

The Documentation Blocks are automatically created by the MC5 programming package and contain a Block identifier, which guarantees a unique link to the program Block. You will always find the corresponding Block-type identifier at the beginning of the Block, extended with the identification 'DO' for Documentation Block. The Block number always consists of 3 numerals, leading zeros will be added if necessary. Because of this, the Documentation Block of Block FB1 will receive the Block identifier FBD0.001

When you load a Block with additional documentation lines again from PG Diskettes in MS-DOS format using MC5, these texts will be displayed again. The lines are shown in one continuous text block. This means that of a Block does not consist of more than one Segment, all documentation texts will be displayed before the first instruction lines. When there are more Segments, all documentation texts of a Segment are displayed at the beginning of this Segment.

8.3.8 Function: Update

Ctrl

The function "update" (Ctrl and F2, Update) allows you to update the file which is currently loaded in the editor.

F2

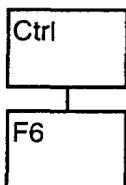
You will need this function to update:

- The symbolic addressing, if you want to assign new symbolic addresses to files, which were already loaded in the editor ranges 01 - 16. (e.g. when changing the symbol file name and use the preset "use symbols file: Yes").
- The offset addresses, if you want to choose a new address mode for the files that have been loaded in the editor ranges 01 -16. (word wise/byte wise).

After changes to Formal Operands. Before compilation a Block has to be updated after changes to Formal Operands. This also concerns Blocks, that call Blocks of which the Formal Operands were changed (search for the location of the call using the XRF). After changes to the first line of the Block.

After activating this function, the entire file will be updated.

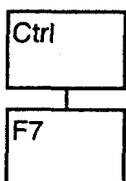
8.3.9 Function: Sym



This function activates the Symbols Window.

It displays a list of the Operands, their Symbols and Descriptions of the current Segment, to a maximum of 8 lines. The 'Arrow' keys Up and Down and 'PgUp' and 'PgDn' allow you to scroll through the list line by line or window by window. The 'Home' key and 'End' key allow you to flip the window from the bottom of the screen to the top and back.

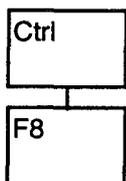
8.3.10 Change to LAD



With the function key combination Ctrl-F7 you can call the LAD editor.

When the cursor is located in a segment which cannot be presented in LAD you will see the error message "Segment not representable in LAD". Changing to the LAD Editor will not take place and the segment will be presented in STL.

8.3.11 Change to CSF



With function key F8 you can call the CSF editor.

When the cursor is located in a Segment which cannot be presented in CSF you will see the error message "Segment not representable in CSF". The change into the CSF editor will not take place and the Segment will be presented in STL.

9. CSF -Control Statement Flowchart

The MC5 CSF-Concept

The graphical editing of S5 programs from Siemens is defined by DIN 40700 standards.

Except for Data Blocks and Function Blocks, Block programming in Control Statement Flowchart structures is possible. Calling of Function Blocks and Program Blocks is supported.

Writing CSF Segments has been simplified considerably with MC5. Editing of arbitrary compounded Segments takes place using only four basic functions.

"Horizontal spread"

"Vertical spread"

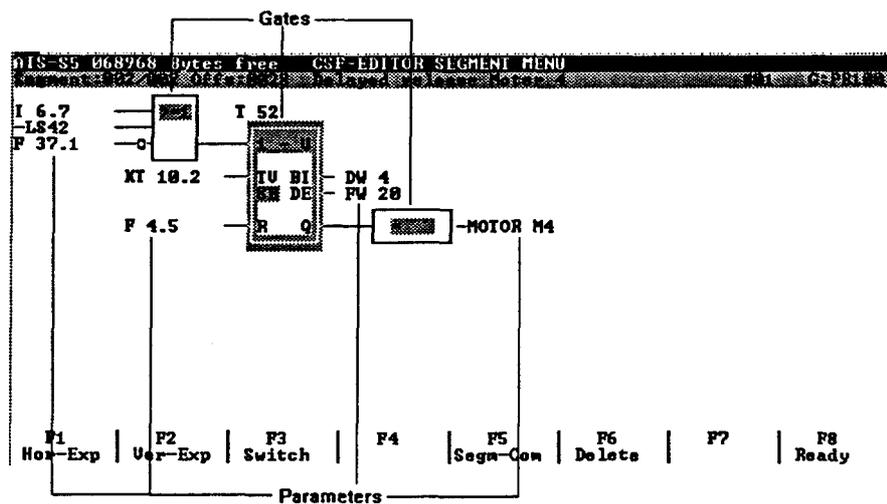
"Change"

"Delete".

In order to be able to use these functions optimally, the following chapter will explain the MC5 CSF concept.

9.1 MC5 CSF Nomenclature

The MC5 CSF Segment consists basically of two different components: Gates and parameters:



Classification of the CSF-information lines

The information line contains the entries:

- current position (Segment number)
- the (main) address of the Segment and the Symbol of the current parameter (when available)
- Segment comment (when available)
- current Edit Buffer
- current path and Block name

For a short while, the Operand at the position of the cursor, its symbol and symbol Comment will be displayed in the Message line (when available).

Gates are objects by which the logical operations are created. The CSF representation has a limited number of Gate types:

Name	CSF-symbol
BIT	Address or symbol
AND	&
OR	>=1
TIMER	SP, SE, SD, SS, SF
Counter	CU, CD
FLIPFLOP	S, R
COMPARISON	!=, » «, »=, «, «=
Intermediate output #	
Output SF,	=, S, R, L + SP, L + SE, L + SD, L + SS, L +
	CU, CD, JC

Apart from the AND and OR Gates, all the Gates have a defined number of parameters. AND and OR Gates can have an endless number of entries.

Parameters can either be constants (e.g. "KT 10.2", "KY 3.0"), addresses (e.g. "Q 6.7", "FW 4.5") or Symbols that have been defined in the Symbols file (e.g. "LS 42", "MOTOR M4").

Attention:
Symbolic constants are only valid when the symbolic mode has been activated in the Preset menu.

9.1.1 The CSF-Editor

The menu structure of the CSF editor can be divided into three levels:

- Block level
- Segment level
- Gate level.

In the following chapter we will look into functions within these levels.

9.1.2 Create new files

You can start editing on Block level by pressing function key F6 "Edit". When no Block has been loaded yet, you will be asked for the name of the Block which is to be edited. If this Block is not available, it will automatically be created.

9.1.3 Editing CSF-Blocks

9.1.3.1 Block level

The basic level in the CSF editor is Block level. From here the Blocks can be loaded and saved.

PgUp

The keys "PgUp" and "PgDn" allow you to leaf through the Block Segment by Segment.

PgDn

It is also possible to select a Segment by pressing function key F3. On this level you can Insert or Delete a complete Segment. Pressing the function key F4 will insert a Segment before the current Segment, whereas F5 will insert a Segment after the current Segment. Pressing function key F7 will delete the current Segment. When function key F8 is pressed, the current Segment will be printed (in accordance with the Presets). By pressing function key F6 ("Edit") you change to a deeper level, the Segment level.

F3

Functions at Block level

F1 Load
F2 Save
F3 Segment #
F4 Insert
F5 Append
F6 Edit
F7 Segm-Del
F8 Print

Alt key and Function key

F1 Help
F2 New name
F3 Search
F4 Replace
F5 Repeat
F8 Clear Buf

Ctrl key and Function key

F1	Compile
F2	Update
F3	Preset
F4	System
F6	Sym
F7	DOC
F8	LAD

9.1.3.2 Segment level

A Segment is a group of STL-Instructions, which represents a logical operation of several input conditions resulting in an output action.

Every Segment, which has been created in CSF structure, must be translated to STL at the moment of saving the program. This STL can always be presented as a CSF structure. Notice however, that not every STL can be represented as a CSF.

Using the following four functions on Segment level, you can edit your program by adding and replacing Segments.

- Horizontal extend
- Vertical extend
- Switch
- Delete.

Functions at Segment level

F1	Hor-Ext
F2	Ver-Ext
F3	Switch
F5	Segm-Com
F6	Delete
F8	Ready

Alt Key and Function Key

F1	Help
----	------

Ctrl Key and Function Key

F3	Preset
F4	System

9.1.3.3 Gate level

The bottom level of the CSF-editor is the Gate level. On this level, you can edit the parameters of the Gates.

Every Gate has one or more parameters. The parameters can be changed by moving the cursor to the parameter and by pressing the RETURN key. The change will be accepted after the RETURN key has been pressed.

In case of Gates with more parameters (Timers, Counters and Compare functions), the parameters will be selected one after the other. However it is not absolutely necessary to handle all parameters (e.g. the BI- or DE-output of a Timer). It is also allowed to Delete these fields. When a parameter is absolutely necessary, you can not leave the field you were editing until a valid entry has been given. The deletion of parameters is done by pressing the ESC-key.

Function keys on Gate level

F1	&	AND gate
F2	»=1	OR gate
F3	=/#	Output gate or "intermediate flag"
F4	SP	SP timer gate
F5	SE	SE timer gate
F6	SD	SD timer gate
F7	SS	SS timer gate
F8	SF	SF timer gate

Alt key and Function key

F1	Help	Activate the Help system
F2	S-FF/S	S-flip-flop gate or Set
F3	R-FF /R	R-flip-flop gate or Reset
F5	JU	Unconditional Jump to Function Blocks
F6	JC	In empty Segment: conditional jump to Function Blocks As Output condition: conditional jump to Program Blocks

Ctrl key and Function key

F1	CU	CU Counter gate
F2	CD	CD Counter gate
F3	!=	!= compare function gate
F4	»«	»«compare function gate
F5	»	» compare function gate
F6	»=	»= compare function gate
F7	«	« compare function gate
F8	«=	«= compare function gate

9.1.4 Leaving the CSF-editor

ESC

If you want to leave the editor only temporarily, press the ESC-key. You will return to the main menu.

If you want to continue working with the editor, activate the editor function by pressing F1, and switch to the appropriate editor buffer (see chapter 9.2.4).

F10

In order to leave the editor permanently, press the function key F10. When you edited files, but did not save them, the following question will appear on the screen:

```

                Save file
    Save          01*PB3 ? (Y/N)
    
```

ESC

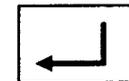
this question contains the number of the appropriate editor buffer (01 ...16), the file name and a Yes/No question. By pressing the ESC-key you can abort this function and return to the editor.

N

Press the character key N (for No) and the file will not be saved.

Y

Answer this questions with Y (for Yes), and the file will be saved under the lame that is shown in the entry field. If there is no file name available, another display will be inserted, in which the file name must be entered (if appl. with the search path). If you do not specify a search path, the file will 3e saved in the current directory.



```

                Save as
    -
    
```

After confirmation by means of RETURN, the file will be saved under the entered name.

If you have entered a name that already exists, you will be asked whether this file must be overwritten or not.

```

                Save block
    PB3 exists, overwrite ? (Y/N)
    
```

ESC

By pressing the ESC-key, you can abort the function and return to the edit mode.

N

By pressing the key N (for No), the existing file will not be overwritten and the current file will be removed from the buffer without being saved.

Y

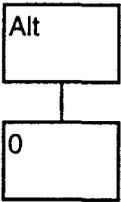
When you confirm to overwrite the existing file by pressing the key Y (for Yes) the existing file will be replaced by the new one.

Attention:

MS-DOS files:
Names with a maximum length of 8 characters and an extension of 3 characters separated by a period.

Blocks:
Only block names, e.g. PB100.SB3

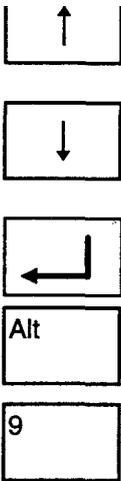
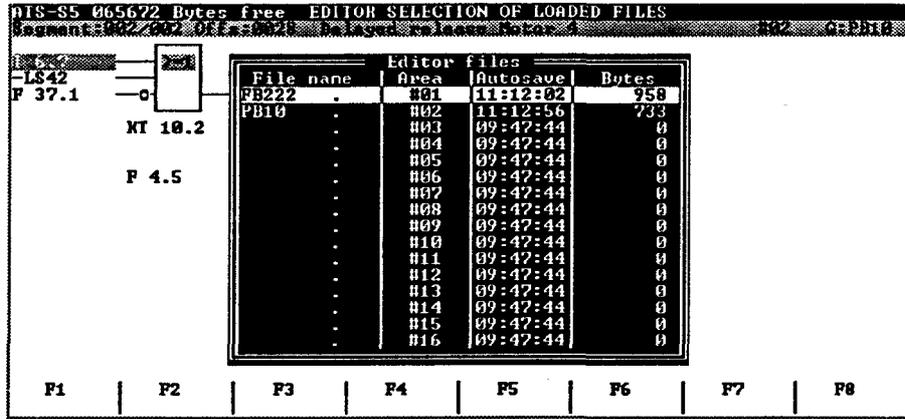
9.1.5 Assigning further CSF-Editor buffers



The editor offers you the possibility to assign up to 16 files to 16 editor buffers.

You can either create new files, or load files from harddisk, diskette, Programmable Controller or EPROM.

After pressing the key combination Alt-0 (i.e. Alt key and zero key simultaneously), the list of the current editor buffers will be displayed.

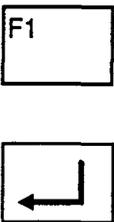


You can select another edit buffer by moving the indicator to the desired position (use cursor keys and) and by pressing the RETURN key.

The editor buffers 01 to 09 can be selected immediately by pressing the Alt key together with one of the keys 1 ...9 of the alpha-numerical keyboard.

9.2 CSF-editor functions using function keys on block level

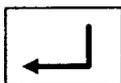
9.2.1 Function: Load file



The function "Load" (F1) allows you to load a file from harddisk, diskette, the programmable controller or EPROM into the current editor buffer. After pressing the function key, the following window will be displayed on the screen:



Attention:
If the error message "unknown device" is displayed, please check the preset "drive(s)".



Please enter the desired Block name (file name e.g. PB22), and confirm this by pressing the RETURN key. If the file is not to be loaded from the current directory, you should include a search path, e.g.:

Load file
C:\FIRM\SEGMENT\NW-SLAVE\PB22

For selecting a file you can also use the directory function (see chapter 13.3) by pressing the RETURN key if the window is empty to display the current directory. If you want a selected display of the tiles, make your selection by entering wildcards in the entry window (e.g. ?B* to display all the Blocks) and confirm this by pressing the RETURN key.

If the current edit buffer already contains a file, it will be overwritten. If you have edited this file, but have not saved it yet, you will be asked the regular questions about saving files.

If you want to clear an edit buffer, use the function "Clear But" (key combination Alt/F8).

Alt

The current buffer will be cleared. In this case too you will be asked the standard questions about saving files.

F8

Save files before quitting
01#PB3. to be saved (Y/N)?

' While editing, you have two edit statuses at your disposal:

- The current status of the files which were loaded in memory. This status is at your disposal if you select the proper edit buffer.
- The current status on harddisk, diskette, EPROM, or in the programmable controller, which comes available by using the Load function and entering the file name (including the search path if necessary). This status is abandoned after saving the buffer with the corresponding file name directory function.

If you want to reload the original file from disk to replace the edited file in the edit buffer, activate the load function by pressing F1 and answer the question "save file" by pressing key N (for No).

9.2.2 Function: Save file

You have the possibility to save the file at any time you like. The function "Save" will overwrite the former status of the file in the directory it originated with the latest status in memory. When configured in the Preset an Overwrite warning will be displayed if the file already exists.

By pressing function key F2, you will activate the "saving procedure". The appropriate message will be displayed in the header line.

F2

Warning:

The automatic save operation (function "autosave" see chapter 6.2.3.) will NOT update the original file. The program will create a special backup file.

9.2.3 Function: Segment Number

F3

After entering the Segment number, the cursor will be positioned at the beginning of the Segment. When you have specified an invalid Segment number, the cursor will be positioned on the nearest Segment possible.

9.2.4 Function: Insert before Segment

F4

This function will insert a Segment before the current Segment.

9.2.5 Function: Append behind Segment

F5

This function will insert a Segment behind the current Segment.

9.2.6 Function: Edit Segment

F6

This function allows you to switch to the Segment level

9.2.7 Function: Delete Segment

F7

This function will delete the current Segment.

9.2.8 Function: Print

F8

This function will print the current Segment on the printing device selected in the Preset (see chapter 6.2.5. "Presets"),

9.2.9 More functions

Alt key and Function key

F1 Help	Activate the help system
F2 New name	Save the file under a new name
F3 Search	Search for a specified text string. Option:i:Ignore upper and lower case
F4 Replace	Search for a specified text string and replace it with another string. Options: g: Global search and replace (through the whole file) l: Ignore upper and lower case n: Do not ask for confirmation to replace the text A combination of these options is possible.
F5 Repeat	Repeat last search (F3) or Replace (F4)
F8 Clear Buf	Clears the current edit buffer.

Ctrl key and Function key

F1 Compile	Compilation of the currently loaded file in the editor.
F2 Update	The formatting of the currently loaded file in the editor. In accordance with the preset, the symbols will also be updated.
F3 Presets	Activate the preset menu.
F4 System	Shell to operating system.
F6 Sym	Activates Symbols Window with a list of the Operands, their Symbols and Descriptions of the current Segment
F7 DOC	Display DOC comment of the segment.
F8 LAD	Switch to Ladder editor. The current Block will be displayed in Ladder.

For more detailed description of these functions, please refer to chapter 8.3 and chapter 8.3.7 and continuing in particular.

9.3 CSF-Editor functions on segment level

9.3.1 Function: Horizontal extend

F1

The function "Horizontal Extend" is used to start in a new (empty) Segment, or if you want to insert a Gate In an existing Segment. During the execution of this function the colour of the cursor will change in accordance with the Presets. Activating this function takes you to the Gate level where you can select the desired Gate from the Menu list.

9.3.2 Function: Vertical extend

F2

The function "Vertical Extend" extends the number of inputs of a Gate.

In case of AND- or OR-Gates, the cursor must be positioned on an existing entry. Pressing the F2 key will cause the insertion of a new input before/above the position of the cursor.

With Timer, Counter and Flip-flop Gates the function is used to provide not assigned inputs with constants.

When you press the F2 key vacant inputs below the current cursor position will be generated for assignment. If this is not the desired position, then you can move the entry field freely within the gate using the cursor keys.

9.3.3 Function: Switch

F3

When the cursor is positioned on a BIT-variable, its function is inverted.

When the cursor is positioned on a AND- or OR-Gate, the Gate type will be changed. Please keep in mind that the CSF-editor will try to optimize the Segment immediately after each change, so that logic operations such as AND before AND and OR before OR will be united into one Gate.

When the cursor is positioned on a Compare Gate the operand type will change from "integer" to "floating point" to double word compare, if the configured address mode in the preset this permits (word wise). The third time F3 is pressed the Compare function itself is changed and the operand is changed to integer again. If the address mode is presetted to "byte wise" only the Compare function will change at each time you press F3.

When the cursor is positioned on a Timer Gate the Timer type will be changed. The order is the same as displayed in the function key line at the Gate level.

When the cursor is positioned on a Counter Gate the Counter type is changed.

When the cursor is positioned on a Flip-flop Gate the Flip-flop type is changed.

When the cursor is positioned on an Output Gate the output type is changed from "=" to "S" to "R" to "=" to "S" to

9.3.4 Function: Segment comment

F5

After pressing this function key, an edit window will be displayed. In this window the "Segment comment" of the current Segment can be entered or edited.

9.3.5 Function: Delete

F6

Only the current Gate will be deleted. If there were outputs of other Gates connected as inputs to this Gate, the upper input will be defined als the new output.

9.3.6 Functions: Ready and Abort

F8

After a segment has been edited, editing can be aborted by pressing either the function key F8 or the Esc-key. A question will follow about whether the changes should be inserted in the Segment or not. If you press the character key Y (for Yes), then the changed Segment will be saved in the current block. If you press the character key N (for No), then the changes will be discarded and the Block will remain in its old condition.

9.3.7 More functions

Alt key and Function key

F1 Help Activate the help system

Ctrl key and Function key

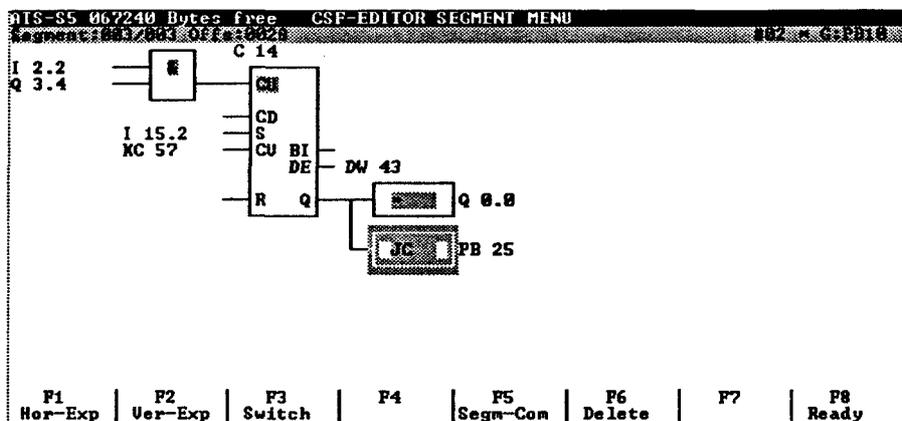
F3 Preset Activate the preset menu

F4 System Shell to the operating system.

9.4 Example: Entering a CSF Segment

In the following you will find an example on how to create a Block using the CSF-editor.

The following segment must be created:



When you are in the Main menu of the MC5 program, you will enter the editor by pressing either function key F1 or F2. When you are (as a result of the preset) in the STL-editor, you can enter the CSF-editor by pressing the key combination Ctrl/F8. The status line will display the current range (in this case it will show that it is empty). By pressing function key F6 (Replace) you will return to the block level because the system must be told first, which Block is to be created. In our example, the Block PB1 will be created, and this name will be entered. Confirm the entry by pressing the RETURN key. In case the Block is not available on your harddisk, you will be asked whether it must be created or not. Confirm this question by pressing Y (for Yes).

In order to edit this Segment, now press function key F6 (Switch), and you will enter Segment level. The status line now shows the current editor number and the current Segment. You will also see that the current Segment is empty.

Now press the function key F1 (Hor-Spr). You are now on the Gate level. Now the function keys show the different Gate types. By pressing either the Control or the Alt key, the other Gate types will appear on the function keys.

F1: Selecting an AND-gate

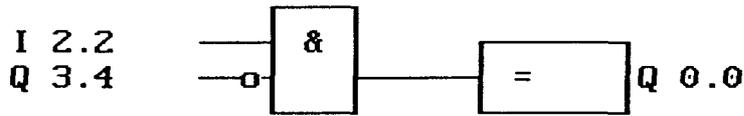
The parameters have a default value of I 0.0.

Please enter:

I2.2

Q3.4

Now you will see "???" in the Output Gate. On the function key bars you will find the output types you are allowed to use. Default "=" is generated select with: (confirm output Q 0.0).



Move the cursor by means of the cursor keys to Q 3.4.

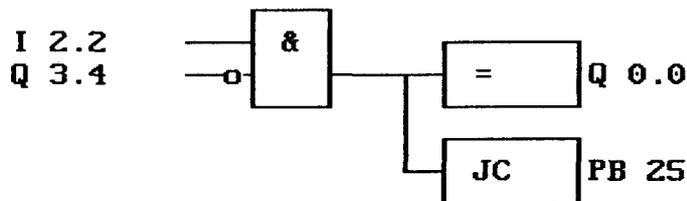
F3: Change

Function key F3 will change the polarity.

Now move the cursor using the arrow keys to the output Q 0.0. By pressing the F1 key, a new element will be attached to the output side. Using the key combination AIVF6 you define a conditional block jump.

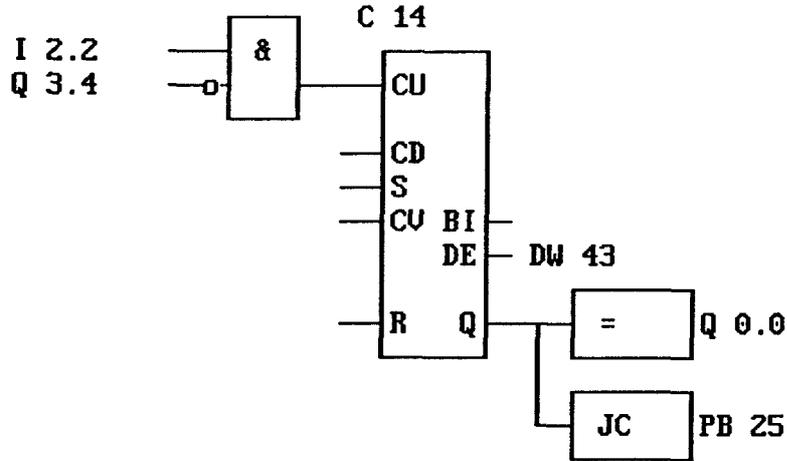
Please enter:

PB25



At this point the counter must be inserted. Move the cursor using the arrow keys to the AND gate and press the function key F1 (Hor-Spr). Ctrl-F1 (selection of the counter gate)

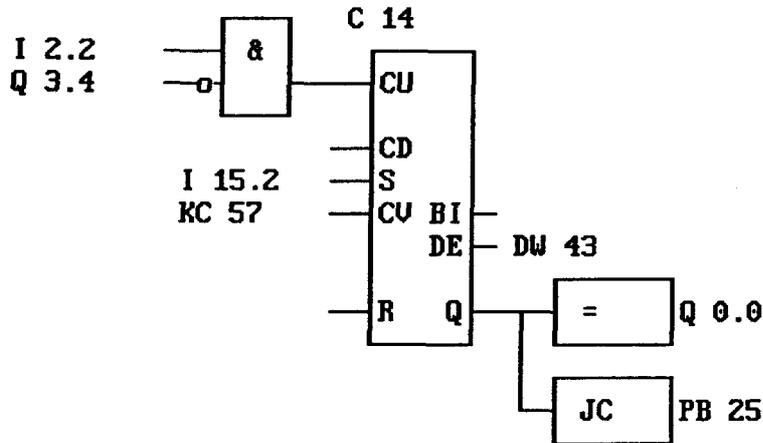
Please enter:
 C14
 ESC (for an empty BI-field)
 DW43



The remaining entries will not be asked for automatically. However, you can add them very easily later on.

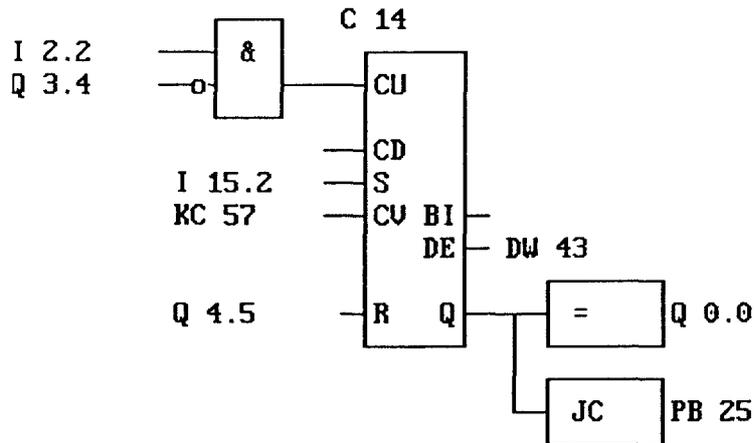
Position the cursor on one of the Inputs of the Counter (in our case the AND-Gate) and enter:

F2 (Ver-Ext)
 (cursor down so that you will not edit the CD field) enter:
 I15.2 and KC57



For the reset input which is still missing, you position the cursor to one of the entries and press the function key F2 (Ver-Ext). Move the entry field to the reset input and enter: Q 4.5

Move the cursor to Q 4.5 and change the polarity by pressing function key F3.



Now you have entered the entire Segment. The Segment level can be left by pressing function key F8 (Ready). Next you will be asked whether you want to save the changes or not. Confirm this question by pressing character key "Y" (for Yes").

9.5 Symbols in CSF

When the symbolics have been configured in the Preset, absolute operands or Symbolic names can be entered. In a CSF Segment however only 8 characters of the Symbolic name will be shown. If the cursor is positioned over an operand, the Symbol name, the Operand and (if available) the Symbol comment will be displayed in the title line.

10. LAD-Ladder logic

The ladder logic concept:

Originally "ladder logic" was the only way in which a PLC could be programmed. Reading a program which was written in ladder logic is generally easier than one written in STL. Especially to people who are used to read electrical relay logic drawings the function of a ladder logic program is easily understood.

Except for Function Blocks and Data Blocks you can program any Block in LAD. A ladder logic program is written in separate parts so called "Segments". Any rung within a Block is represented by two or more lines of STL. The STL statement that separates two Segments in a Block is '****'. The LAD-programmer need not care about the underlying STL statements because these are automatically generated by the LAD-editor. A LAD Segment is always representable by a series of STL statements. Not every series of STL-statements is representable in LAD though. A LAD Segment can always be represented as a CSF-segment. Not any CSF-segment is representable in LAD though.

The creation, alteration and deletion of a Segment or part of it takes place using only four basic functions.

- "Insert/Append"
- "Switch"
- "Branch"
- "Delete"

In order to be able to use these functions optimally, the following chapter will explain the MC5 LAD concept.

10.1 MC5 LAD Nomenclature

A LAD Segment represents a logical function between the one or more 'Contacts' on the left side of the Segment and one or more Contacts on the right side of the Segment.

Therefore the left side is called the 'input side' and the right side is called the 'output side'. Contacts on the input side need not necessarily be Inputs nor need Contacts on the right side necessarily be Outputs.

Basic Contact functions are:		Type:
Examine If Closed	-]I-	Input
Examine If Open	—]I—	Input
Output Energize	-()-	Output
Output Latch	-(S)-	Output
Output Unlatch	-(R)-	Output
Jump Conditionally	—(JC)—	Output

Special Contact functions are:

Comparison function (6 types)	Input
Timer function (5 types)	Input/Output
Counter function (2 types)	Input/Output
Flipflop function (2 types)	Input/Output

An explanation of how to write programs using these functions is beyond the scope of this manual and can be found in the manuals that come with the PLC's or in almost any book on the subject of industrial automation using PLC's.

10.1.1 The LAD-Editor

The menu structure of the LAD editor can be divided into four levels:

- Block level
- Segment level
- Contact level
- Branch level

10.1.2 Create new files

You can start editing on Block level by pressing function key F6 "Edit". When no Block has been loaded yet, you will be asked for the name of the Block which is to be edited. If this Block is not available, it will automatically be created.

10.1.3 Editing LAD Blocks and Segments

10.1.3.1 Block level

The first level of the LAD editor is the Block level.

PgUp
PgDn
F3

On the Block level you can browse through the Block Segment by Segment using the "PgUp" and "PgDn" keys.

You may go to any desired Segment immediately by entering the Segment number. You can scroll the cursor across the instructions of the Segment using the cursor keys (Segments are not confined to screen boundaries). Just try it. You will quickly feel at ease to address any contact within a block. You can Load "F1" and Save "F2" Blocks into and from this level respectively. Also you can switch to another editor area or buffer (Alt 0 ... 9 keys) which may contain another Block or any text file. You can print the current Segment by pressing "F8". This Segment will then be printed to the current printing device (selectable through the Preset menu). You can also delete a whole Segment ("F7" Segm-Del). The Segment level of the editor is reached through any of the function keys 'Insert (F4), Append (F5) or Edit (F6). Pressing F4 (Insert) causes an empty Segment to be added to the Block immediately preceding the current Segment. Pressing F5 ('Append') causes an empty Segment to be added to the Block immediately following the current Segment.

Functions at Block level

F1	Load
F2	Save
F3	Segment #
F4	Insert
F5	Append
F6	Edit
F7	Segm-Del
F8	Print

Alt key and Function key

F1	Help
F2	New name
F3	Search
F4	Replace
F5	Repeat
F8	Clear Buf

Ctrl key and Function key

F1	Compile
F2	Update
F3	Preset
F4	System
F5	DOC
F6	Sym
F8	STL

10.1.3.2 Segment level

At the Segment level a segment can be entered or altered if it already existed. The cursor can be moved through the Segment using the arrow keys. The Segment is automatically scrolled across the screen, in order to keep the cursor visible.

Again functions like 'Insert' (F1) and 'Append' (F2) are at your disposal. Pressing F1 (Insert) will create a vacant Contact-field in front of the cursor position to admit the entry of a new Contact. Pressing F2 (Append) will create a vacant Contact-field behind the cursor position. After "Insert" or "Append" you will find yourself at the 'Contact-level'.

To change the operand of an already existing contact, you position the cursor on this contact and press the RETURN key. In some situations ambiguity can exist as to where exactly the new contact should be inserted. This ambiguity is present whenever next to the current Contact a Branch start or Branch end lies. In these cases pressing 'Insert' or 'Append' will insert a new Contact in between the current Contact and the Branch. Should you need or wish to 'Insert' or 'Append' on the other side of the Branch pressing the 'Ctrl' key presents two more options: 'Super-Insert (Ctrl-F1) and 'Super-Append' (Ctrl-F2). With respect to the Branch these functions put the new Contact on the opposite side.

Pressing 'Switch' (F3) will change the type of the current Contact depending on the Contact function. Some Contacts have more than two

F4

types like Timers and Comparison functions. In these cases press the 'Switch' key as often as necessary to switch to the desired function type. The possible types will rotate through the function i.e. after all the possible types have occurred the original type will appear again. For more information please refer to chapter 9.4.3.

Pressing 'Branch' (F4) will take you to the Branch level.

F5

Pressing 'Segm-Com' (F5) will allow you to add Segment Comment to the Segment or edit existing comment. This text is stored in the Statement Comment area of the STL line proceeding the first statement of the Segment (either in the Block-header or after a "****"-statement).

F7

Pressing 'Delete' (F7) will delete the current Contact and leave the rest of the Segment intact as much as possible. When you delete a function like an S-flipflop this means that the 'Reset Branch' of this Flipflop (when present) will be deleted as well. The "Set Branch" of the Flipflop will be connected through to the Output side of the former Flipflop.

F8

Pressing 'Ready' (F8) will take you back to the Block level. If any edits were made a window will pop up asking whether you want to 'Merge the current segment into the Block'. The merging will take place only if the 'Y' key is pressed.

Whenever you have created a function that can have multiple Inputs such as a Timer, a Counter or a Flipflop, you may want to add an extra Input to it. This is accomplished by positioning the cursor on (one of the) Input Branch(es) and pressing 'New Input' (Alt-F2). At the first possible location a new Input Branch to the function will appear which can then be extended using the other editing functions. Only a counter can have more than two Inputs. If the new Input appears at a position that you do not want to connect to, press the 'Down arrow' key and the new Input will move one position down (see example).

Functions at Segment level

- F1 Insert
- F2 Append
- F3 Switch
- F4 Branch
- F5 Segm-Com
- F6 Delete F8 Ready

Alt key and Function key

- F1 Help
- F2 New Input

Ctrl key and Function key

- F1 S-Insert
- F2 S-Append
- F3 Preset
- F4 System

10.1.3.3 Contact level

The Contact level is presented whenever a choice of Contact function or type has to be specified. As more choices exist than can be presented in the function key bar, only the first 8 choices are presented. You can bring up the other functions and types by holding down either the 'Ctrl' or the 'Alt' key.

Functions at Contact level

F1	-I I-	Examine if closed
F2	-I/I-	Examine if open
F3	=/#	Output energize or Intermediate Output
F4	SP	SP timer
F5	SE	SE timer
F6	SD	SD timer
F7	SS	SS timer
F8	SF	SF timer

Alt key and Function key

F1	Help	Activate the Help System
F2	S-FF/S	S-flip-flop or Set
F3	R-FF/R	R-flip-flop or Reset
F5	JU	Unconditional Jump to Function Block
F6	JC	In empty Segmentconditional Jump to Function Block As Output condition: conditional Jump to Program Block

Ctrl key and Function key

F1	CU	CU Counter
F2	CD	CD Counter
F3	!=	!= compare function
F4	»«	»« compare function
F5	»	» compare function
F6	»=	»= compare function
F7	«	« compare function
F8	«=	«= compare function

10.1.3.4 Branch level

The Branch should be entered whenever you want to program an OR-Branch. There are two basic functions: Extending an existing Branch and creating a new one.

To create a new Branch, position the cursor on the Contact across which you want to program a Branch and press 'New' (F3). When allowed a branch will appear across the current Contact. At this point you can now increase the 'Branch span' by pressing the Left and Right arrow keys. The Segment will be redrawn on the screen after every increase of span to allow you to position the branch in the right position. At any point this operation can be aborted by pressing the escape (ESC) key. Whenever the RETURN key is depressed the Branch is inserted and an 'Examine If Closed' Contact appears.

To extend an existing Branch or set of Branches, position the cursor on one of the existing Branches and press Branch (F4). Then press either 'Ext Up' (F1) or 'Ext Down' (F2). The new Branch will appear together with a new "Examine If Open" Contact above respectively underneath the cursor position.

Functions at Branch level

F1 Ext-Up

F2 Ext-Down

F3 New

Alt key and Function key

F1 Help

Ctrl key and Function key

F3 Preset

F4 System

10.1.4 Leaving the LAD-editor

ESC

If you want to leave the editor only temporarily, press the ESC-key. You will return to the main menu.

If you want to continue working with the editor, activate the editor function by pressing F1, and switch to the appropriate editor buffer (see chapter 9.3.4).

F10

In order to leave the editor permanently, press the function key F10. When you edited files, but did not save them, the following question will appear on the screen:

```

                Save file
          Save  01*PB3 ? (Y/N)
    
```

ESC

This question contains the number of the appropriate editor buffer (01 ...16), the file name and a Yes/No question. By pressing the ESC-key you can abort this function and return to the editor.

N

Press the character key N (for No) and the file will not be saved.

Y

Answer this questions with Y (for Yes), and the file will be saved under the name that is shown in the entry field. If there is no file name available, another display will be inserted, in which the file name must be entered (if appl. with the search path). If you do not specify a search path, the file will be saved in the current directory.

Attention:

MS-DOS files:
Names with a maximum length of 8 characters and an extension of 3 characters separated by a period.

←

```

                Save as
          -
    
```

After confirmation by means of RETURN, the file will be saved under the entered name.

If you have entered a name that already exists, you will be asked whether this file must be overwritten or not.

Blocks:

Only block names, e.g. PB100, SB3

```

                Save block
          PB3 exists, overwrite ? (Y/N)
    
```

ESC

By pressing the ESC-key, you can abort the function and return to the edit mode.

N

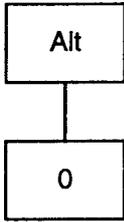
By pressing the key N (for No), the existing file will not be overwritten and the current file will be removed from the buffer without being saved.

Y

When you confirm to overwrite the existing file by pressing the key Y (for Yes) the existing file will be replaced by the new one.

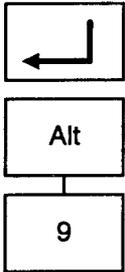
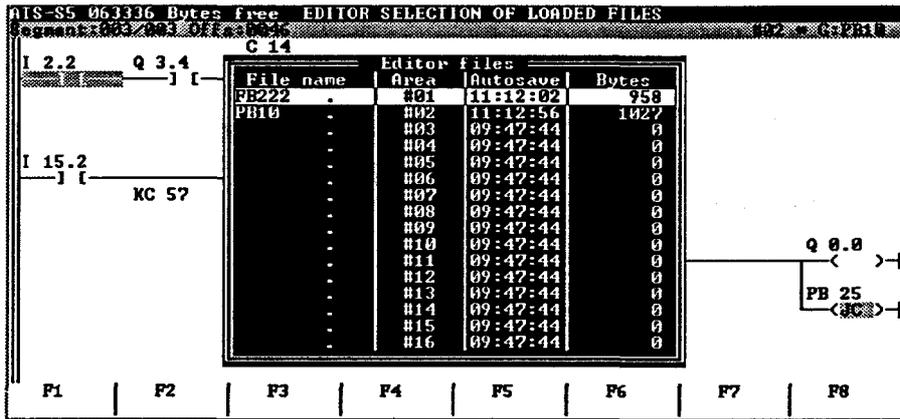
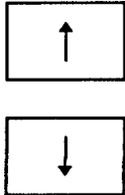
10.1.5 Assigning further LAD-Editor buffers

The editor offers you the possibility to assign up to 16 files to 16 editor buffers.



You can either create new files, or load files from harddisk, diskette, Programmable Controller or EPROM.

After pressing the key combination Alt-0 (i.e. Alt key and zero key simultaneously), the list of the current editor buffers will be displayed.



You can select another edit buffer by moving the indicator to the desired position (use cursor keys and) and by pressing the RETURN key.

The editor buffers 01 to 09 can be selected immediately by pressing the Alt key together with one of the keys 1 ...9 of the alpha-numerical keyboard.

10.2 LAD-editor functions using function keys on block level

10.2.1 Function: Load file

F1

The function "Load" (F1) allows you to load a file on harddisk, diskette, the programmable controller or EPROM into the current editor buffer. After pressing the function key, the following window will be displayed on the screen:

Attention:
If the error message "unknown device" is displayed, please check the preset "drive(s)".

Load file
-

Please enter the desired Block name (file name e.g. PB22), and confirm this by pressing the RETURN key. If the file is not to be loaded from the current directory, you should include a search path, e.g.:

Load file
C:\FIRM\SEGMENT\NW-SLAVE\PB22

For selecting a file you can also use the directory function (see chapter 14.3) by pressing the RETURN key if the window is empty to display the current directory. If you want a selected display of the files, make your selection by entering wildcards in the entry window (e.g. ?B* to display all the Blocks) and confirm this by pressing the RETURN key.

If the current edit buffer already contains a file, it will be overwritten. If you have edited this file, but have not saved it yet, you will be asked the regular questions about saving files.

If you want to clear an edit buffer, use the function "Clear But" (key combination AIVF8).

Alt

The current buffer will be cleared. In this case too you will be asked the standard questions about saving files.

F8

Save files before quitting
01#PB3. to be saved (Y/N)?

While editing, you have two edit statuses at your disposal:

- The current status of the files which were loaded in memory. This status is at your disposal if you select the proper edit buffer.

The current status on harddisk, diskette, EPROM, or in the programmable controller, which comes available by using the Load function and entering the file name (including the search path if 'necessary). This status is abandoned after saving the buffer with the corresponding file name (function key F2, or after the regular saving procedure). For loading files you can use the show directory function.

If you want to reload the original file from disk to replace the edited file in the edit buffer, activate the load function by pressing F1 and answer the question "save file" by pressing key N (for No).

10.2.2 Function: Save file

You have the possibility to save the file at any time you like. The function "Save" will overwrite the former status of the file in the directory it originated with the latest status in memory. When configured in the Preset an Overwrite warning will be displayed if the file already exists.

F2

By pressing function key F2, you will activate the "saving procedure". The appropriate message will be displayed in the header line.

Warning:

The automatic save operation (function "Autosave" see chapter 6.2.3.) will NOT update the original file. The program will create a special backup file.

10.2.3 Function: Segment Number

F3

After entering the Segment number, the cursor will be positioned at the beginning of the Segment. When you have specified an invalid Segment number, the cursor will be positioned on the nearest Segment possible.

10.2.4 Function: Insert before Segment

F4

This function will insert a Segment before the current Segment.

10.2.5 Function: Append behind Segment

F5

This function will insert a Segment behind the current Segment.

10.2.6 Function: Edit Segment

F6

This function allows you to switch to the Segment level.

10.2.7 Function: Delete Segment

F7

This function will delete the current Segment.

10.2.8 Function: Print

F8

This function will print the current Segment on the printing device selected in the preset (see chapter 6.2.5. "Presets").

10.2.9 More functions

Alt key and Function key

- F1 Help Activate the help system
- F2 New name Save the tile under a new name
- F3 Search Search for a specified text string.
Option:
l: Ignore upper and lower case
- F4 Replace Search for a specified text string and replace it
with another string.
Options:
g: Global search and replace (through the
whole file)
i: Ignore upper and lower case
n: Do not ask for confirmation to replace the
- F5 Repeat A combination of these options is possible.
Repeat last search (F3) or Replace (F4)
- F8 Clear But Clears the current edit buffer.

Ctrl key and Function key

- F1 Compile Compilation of the currently loaded file in the
editor.
- F2 Update The formatting of the currently loaded file in the
editor. In accordance with the preset, the
symbols will also be updated.
- F3 Presets Activate the preset menu.
- F4 System Shell to operating system.
- F6 Sym Activates Symbols Window with a list of the
Operands, their Symbols and Descriptions of the
current Segment
- F7 DOC Display DOC comment of the segment.
- F8 STL Switch to Statement list editor. The current Block
will be displayed as a statement list.

For more detailed description of these functions, please refer to chapter 8.3 and chapter 8.3.7 and continuing in particular.

10.3 LAD-Editor functions at Segment level.

10.3.1 Function: Insert / Super Insert.

F1

This function inserts space for a new Contact or a new Function before the current position of the cursor.

Ctrl

The change to the Contact level will take place automatically.

F1

Super Insert will insert a Contact at the left side of an existing Branch-Start.

10.3.2 Function: Append / Super Append.

F2

This function inserts space for a new Contact or a new Function behind the current position of the cursor.

Ctrl

The change to the Contact level will take place automatically.

F2

Super Append will insert a Contact at the right side of an existing Branch.

10.3.3 Function: New Input

Alt

In combination with the Alt-key the function New Input can be activated to take use of vacant inputs of Functions with several inputs like Timers and Counters.

F2

For this you position the cursor on a Contact in the column that will contain the new input should be tied to the Function (the column proceeding to the column of the Function) and press Alt-F2.

10.3.4 Function: Switch.

F3

Is the cursor positioned on a Bit Contact, the function of the Contact is inverted.

F4

Is the cursor positioned on a Compare instruction, the function of the compare is changed from Integer to Flowing Point to Double Word (if the Preset of the address mode this allows, see Preset Online). Next the compare instruction itself will change. Is the cursor positioned on a Timer, Counter or Flip-Flop instruction, the type of Timer, Counter or Flip-Flop will be changed. Is the cursor positioned on a Output Contact, the type of Output will be changed.

10.3.5 Function: Branch.

This function will take you to the Branch level. At this level you may extend an existing Branch or Add a new Branch to the Segment.

10.3.6 Function: Segment Comment.

F5

This function will activate an Entry Window to add or change the Segment Comment.

10.3.7 Function: Delete.

F6

This function will delete the Contact or Instruction at the position of the cursor.

10.3.8 Function: Ready.

F8

This function will end the edit session. You will be asked if you want to accept the changes (press Y) or if you want to discard the changes (press N).

10.4 LAD-Editor functions at Contact level.

10.4.1 Function: RETURN / change Contact or Contact Symbol.

After activation of an insert function you get to the Contact level. At the insert position a Place holder is displayed that can be replaced by a Contact or Instruction shown in the Function-key bar. The Function-keys in combination with the Ctrl-key or Alt-key offer the remaining choices that are not displayed in the main Function-key bar.

There are different types of Place holders with the following meaning:

- ?----- The selection of a new Contact or Instruction is allowed.
- (???)—— A new Output Contact may be selected.
- «—?—» Before selecting a new Contact a new Branch may be extended to more Contacts in the Segment using the cursor-keys left and right. (Available after activation of the function "New Branch".

After selecting the desired Contact you will be asked for the appropriate Operand. Through the Preset you may choose to be presented with an indication of the type of Operand that is expected, (see chapter 6.2.3 Default Operands).

10.5 LAD-Editor functions at Branch level.

F1

10.5.1 Function: Extend Up.

This function allows you to create a parallel Branch above the Branch the cursor is in.

F2

10.5.2 Function: Extend Down.

This function allows you to create a parallel Branch underneath the Branch the cursor is in.

10.5.3 Function: New.

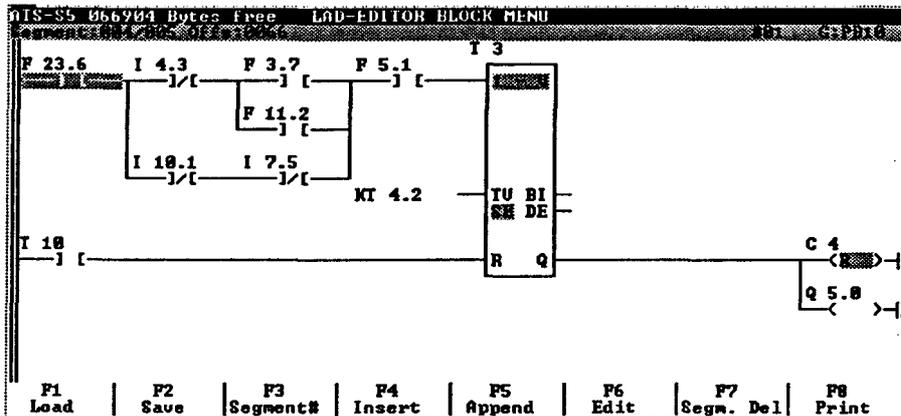
F3

This function allows you to create a new Branch over the Contact the cursor is positioned at. Using the cursor-keys it is possible to extend the reach of the Branch to the left and to the right.

10.6 Example: Entering a LAD Segment

Example 1.

Creating a Segment can be achieved in many ways. One way is described here for the Segment of picture /1. While creating the Segment we try to show you as many concepts of Ladder-programming in MC5 as possible, although this may be not the most efficient way!



We will start programming the Segment starting with I 4.3. First we select F6 Edit then, as always when creating a new Segment, F1 Insert or F2 Append. Selecting F2 -]/[- will bring a Segment on the screen that has to be filled. We type I 4.3 and press RETURN. The cursor will jump to the Output instruction. Pressing RETURN will accept the default Output instruction (Output Energize). Typing Q 5.0 will complete the first stage.

Following the next actions we enter F 3.7, F 5.1 and T 3:

F2 Append; F1 -] [-; type F 3.7 «RETURN»

F2 Append; F1 -] [-; type F 5.1 «RETURN»

F2 Append; F5 SE ; type T 3 «RETURN»;

type kt 4.2 «RETURN»; ESC; ESC

After this we position the cursor on Q 5.0 and press F2 Append; a new output will be inserted above the existing Q 5.0. Press:

Alt-F3 R-FF/R and type C 4.

To create the Branch containing F 11.2 we position the cursor on F 3.7 and press:

F4 Branch; F3 New ; «RETURN»; type F 11.2.

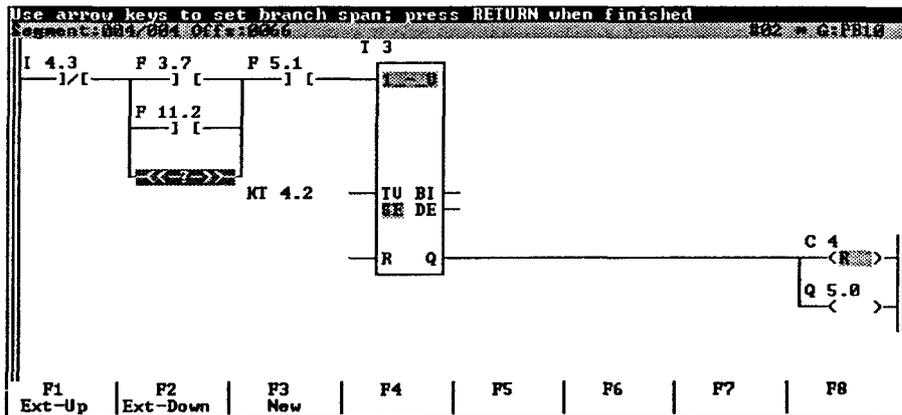
To create the Branch containing I 10.1 and I 7.5 we position the cursor at F 3.7 or F 11.2 and press:

F4 Branch; F3 New ; cursor left «-»;«RETURN»;

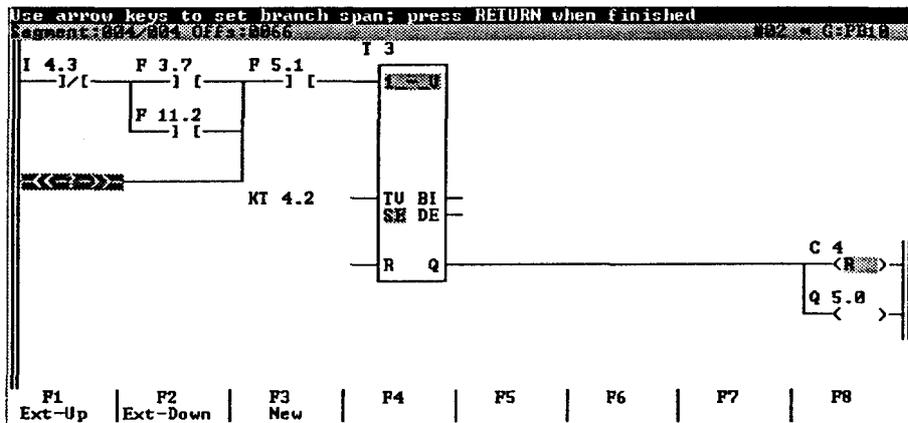
type I 10.1; F3 Switch;

F2 Append; F2 -] [-; type I 7.5.

See picture 10/2 and 10/3.



Picture 10/2



Picture 10/3

To assign the reset-condition to the timer we position the cursor on F 5.1 and press: Alt-F2 New Input; «RETURN»; type T 10.

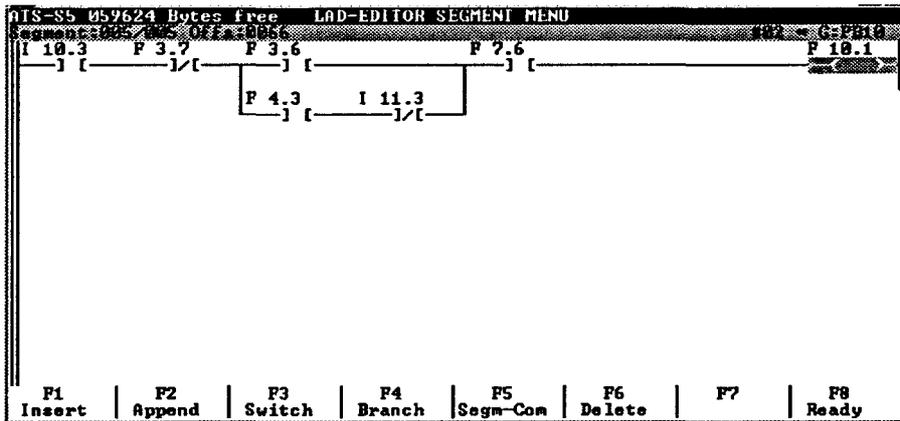
Finally we add F 23.6 by positioning the cursor on I 4.3 and pressing:

Ctrl-F1 S-Insert; F1 -] [-; type F 23.6.

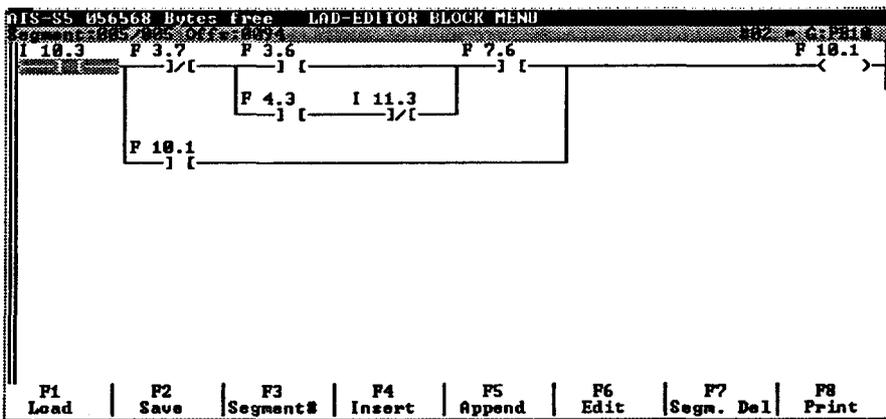
Pressing F8 Ready and 'Y' we confirm the entry of this

Segment. Example 2.

This example demonstrates the ease of creating an additional Branch. Let's say we already created the Segment of picture 10/4 and we want to add a Branch resulting in the Segment of picture 10/5.



Picture 10/4

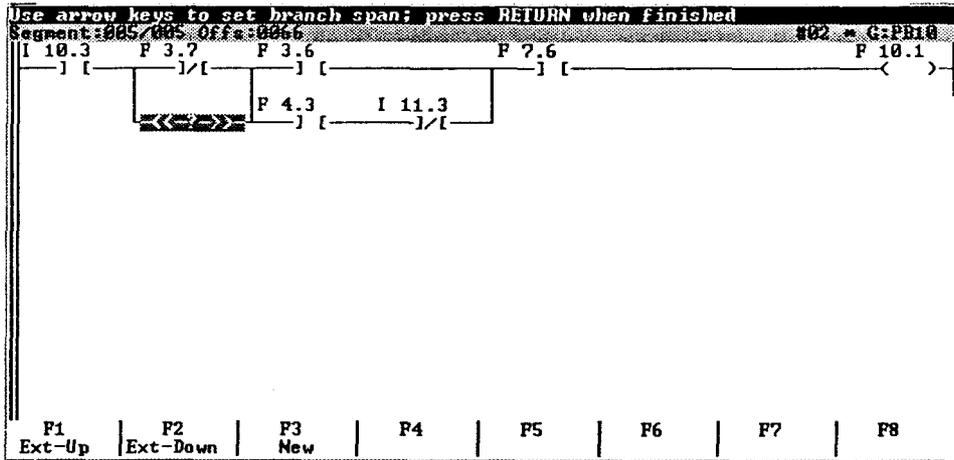


Picture 10/5

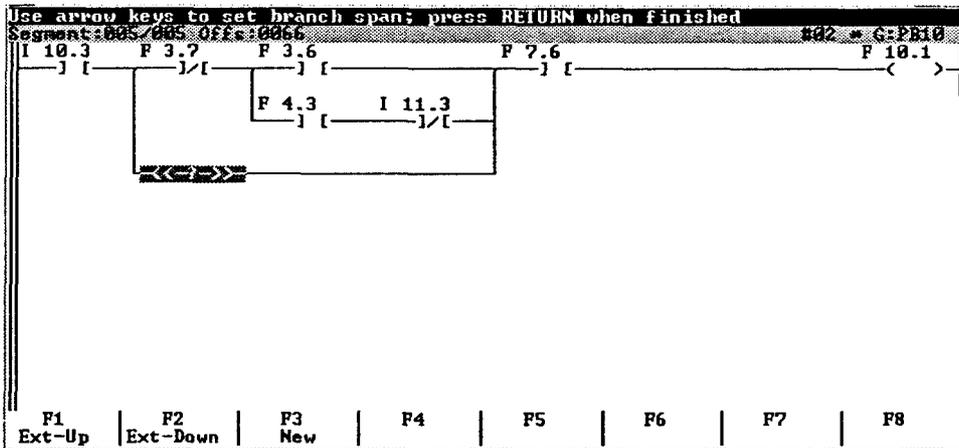
To do this we position the cursor on F 3.7 and press:

F4 Branch; F3 New; Cursor-right ->; Cursor-right ->; «RETURN»; type F 10.1.

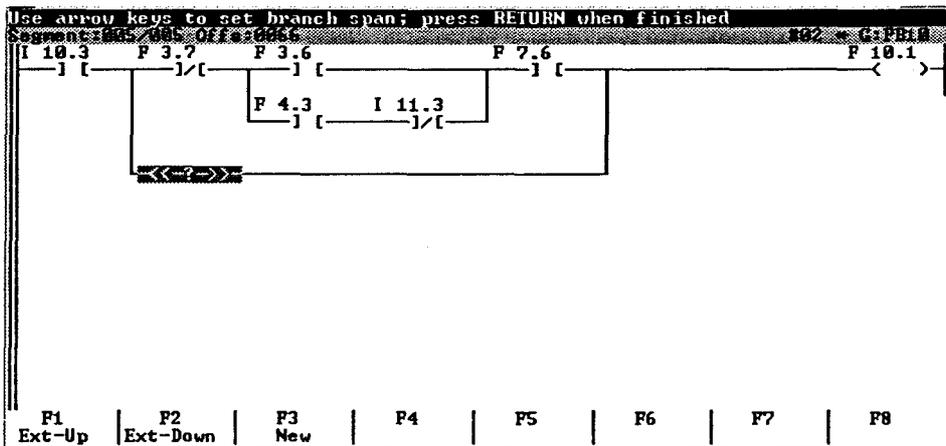
See Pictures 10/6, 10/7 and /8.



Picture 10/6



Picture 10/7



Picture 10/8

11. Transfer menu

11.1 Activation and function key lay-out

You can enter the Transfer Menu from the Main Menu by pressing function key F4 (Transfer). The following function key lay-out will be displayed:

Function key lay-out of the transfer menu:

F1	S5D-RIe	S5D-File. pack, unpack and transfer functions
F2	SEQ-File	transfer and convert functions for Symbol files
F3	All	Copy program for diskettes
F4	Block	Transfer PLC Blocks

Alt key and function key:

F1	Help	Activate help system
----	------	----------------------

Ctrl key and function key:

F3	Preset	Activate preset menu
F4	System	Shell to operating system

11.2 S5D-File transfer.

F1

Function-key F1 (S5D-File) in the Transfer Menu activates the S5D-File Menu in which S5D-files can be transferred from CPM-diskette to the MS-DOS environment and back. The S5D-files transferred to MS-DOS may be Unpacked in a directory. Also may selected Blocks be Packed into an S5D-file to be transferred to a CPM-diskette or used under MS-DOS (e.g. with Siemens S5 under MS-DOS).

11.2.1 S5D-File Menu.

F1

With the function-key F1 (Pack) Blocks may be selected with the Directory-function. The selected Blocks are saved to a S5D-file which contents also may be displayed with the Directory-function (F2 Dir) in the Info menu. The S5D-file is saved under MS-DOS and can be used with Siemens S5 under MS-DOS.

With the function-key F2 (Unpack) an S5D-file under MS-DOS may be selected using the Directory-function. The selected S5D-file contains Blocks which also may be selected for unpacking using the Directory-function. The unpacked Blocks are saved in the current directory.

F2

F4

Function-key F4 (DOS-CPM) is used to transfer S5D-files stored under MS-DOS to a CPM-diskette. A formatted CPM-diskette must be available in the drive.

F6 Function-key F6 (CPM-DOS) is used to transfer S5D-files stored at a CPM-diskette to MS-DOS. A Directory Window of the CPM-diskette will show only S5D-files to select from.

11.3 Symbol-file transfer/conversion

F2 Function-key F2 (SEQ-File) in the Transfer Menu activates the SEQ-File Menu in which SEQ-files can be transferred from CPM-diskette and back.

11.3.1 SEQ-File Menu.

F1 With function-key F1 (S5--»MC5) an SEQ-file stored under MS-DOS in CPM-format may be converted to ASCII-format.

F2 With function-key F2 (MC5--»S5) an SEQ-file in ASCII-format may be converted to CPM-format. The SEQ-file can be used with Siemens S5 under MS-DOS.

F4 Function-key F4 (DOS-»CPM) is used to transfer SEQ-files stored in ASCII-format to a CPM-diskette. A formatted CPM-diskette must be available in the drive.

F6 Function-key F6 (CPM-»DOS) is used to transfer SEQ-files stored at a CPM-diskette to MS-DOS. During transfer the file will be converted from CPM-format into ASCII-format. A Directory Window of the inserted CPM-diskette will be displayed showing only SEQ-files to select from.

11.4 Copy PG-Diskettes

The MC5 programming package offers you the possibility to copy entire PG diskettes. If necessary, the target diskette can also be formatted before the copying procedure is started. In order to prevent data loss, you should use the write protect tab on the source diskette.

F3 After pressing function key F3 (All), a new function key list will be displayed. The lay-out of the function keys depends on the presets (Preset: "Drives" see chapter 6.2.1).

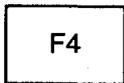
When you press the function key that represents the desired type of diskette (PG635/675/685), the screen will display handling instructions.

On the screen you can see, which track is being written/read. Since the contents of the source diskette is kept in a buffer, you can copy to several target diskettes, without the need to read the entire contents again. The appropriate questions will be asked at the end of the copying procedure. Transfer errors will be reported in plain texts.

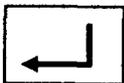
Esc The Esc-key allows you interrupt the function "copy diskettes" at any moment.

11.5 Transferring Blocks

11.5.1 General



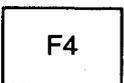
The function F4 (Block) will enable you to transfer Blocks or MS-DOS tiles to different kinds of storage media. The directory function (see chapter 14.3.) allows you to select Blocks (files) for transferring.



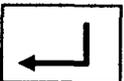
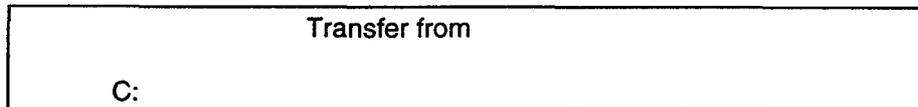
By using the Esc-key, you can interrupt the execution of the transferring and return to the Transfer Menu.

If you want to transfer data to a diskette, the diskette must be properly formatted (DOS, PG635, PG675, PG685).(see Special Menu, function "Format").

11.5.2 Entry window, operation and messages



Entry window "Transfer from " When you press the function key F4 (Block) while you are in the transfer menu, the following entry window will be displayed on the screen:



For selecting one or more blocks, you may use the directory function (see chapter 14.3). If you enter the Block name (file name) directly in the entry window, you must also specify the search path if applicable, because without this the MC5 program will use the current path. You can enter:

Logical drive names, all the available harddisks and disk drives of the computer. In addition to the MS-DOS drive name, MC5 adds the following indication:

- FDO: A-drive as PG drive
- FD1: B-drive as PG drive
- PC: Programmable Controller
- EP: EEPROM/EPROM Module

Directory name,

This entry is only possible when blocks are being transferred by MS-DOS. The directory name can only be omitted in case the block is being transferred from the current directory.

File nameThe DOS file name or block declarator(e.g. FB1, DB25, OB31).

Attention:
The error message "unknown device" indicates an unspecified PG drive.

Entry window "Transfer to" After you have selected the blocks which are to be transferred (confirm this by pressing the RETURN-key or F10), the entry window for the transfer target will be displayed.

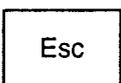


Transfer to
FD0:

In this case too you have to enter the drive name and (for MS-DOS) the directory name.

The transferring of the selected blocks will begin, as soon as you confirm the entries by pressing the RETURN-key.

The screen will specify for each file, whether the transfer was error free, or whether the transfer has not taken place because at an error.



The transfer can be aborted at any moment by pressing the Esc-key. The function "Block" has ended when the message "Transfer completed" is displayed on the screen. The transfer menu is ready for the next operation.

11.5.3 Examples of the function "Transfer Block"

MS-DOS to
MS-DOS

Transfer from
C:\VERZ1\FB*.*

Transfer to
A:\VERZ2*.*

Only Function Blocks are displayed for selection to be transferred from harddisk C: (directory VERZ1) to the diskette in drive A: (directory VERZ2). The directory VERZ2 must already exist.

MS-DOS to
FDO

Transfer from
C:\VERZ1\FB1

Transfer to
FD0 :

The block FB1 is transferred from harddisk c: (directory VERZ1) to the PG diskette in drive FDO. The DOS file is adapted to PG format.

Entry window "Transfer to" After you have selected the blocks which are to be transferred (confirm this by pressing the RETURN-key or F10), the entry window for the transfer target will be displayed.

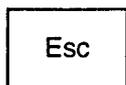


Transfer to
FDO:

In this case too you have to enter the drive name and (for MS-DOS) the directory name.

The transferring of the selected blocks will begin, as soon as you confirm the entries by pressing the RETURN-key.

The screen will specify for each file, whether the transfer was error free, or whether the transfer has not taken place because at an error.



The transfer can be aborted at any moment by pressing the Esc-key. The function "Block" has ended when the message "Transfer completed" is displayed on the screen. The transfer menu is ready for the next operation.

11.5 3 Examples of the function "Transfer Block"

MS-DOS to
MS-DOS

Transfer from
C:\VERZ1\FB*.*

Transfer to
A:\VERZ2*.*

Only Function Blocks are displayed for selection to be transferred from harddisk C: (directory VERZ1) to the diskette in drive A: (directory VERZ2). The directory VERZ2 must already exist.

MS-DOS to
FDO

Transfer from
C:\VERZ1\FB1

Transfer to
FDO :

The block FB1 is transferred from harddisk c: (directory VERZ1) to the PG diskette in drive FDO. The DOS file is adapted to PG format.

FDO to MS-DOS

Transfer from
FD0 : *.*

Transfer to
A:\VERZ2*.*

All Blocks of drive DFO: are displayed for selection to be transferred to the diskette in drive A: as a DOS file to directory VERZ2. Directory VERZ2 must already exist.

MS-DOS to EPROM/EEPROM

Transfer from
C:\VERZ1\FB1

Transfer to
EP :

The block FB1 is transferred from the harddisk C: (directory VERZ1) to the EPROM EP:.

PC to MS-DOS

Transfer from
PC : FB11

Transfer to
C:

The block FB11 is transferred from the PC: to the current directory on the harddisk C:

EPROM/EEPROM to FDO

Transfer from
EP : ?B*

Transfer to
FD0 :

All Blocks (except FX and DX) are displayed for selection to be transferred from the EPROM EP: to the PG diskette in drive FDO. Please refer also to chapter 14.3 for usage of the Directory Function.

12. Delete menu

12.1 Activation and function key lay-out

F5

Function key F5 will activate the delete menu (remove) and the function key lay-out will be displayed.

Function key lay-out Delete menu

F1	PC	PC overall reset
F2	PG...	Delete PG diskette *)
F3	PG...	Delete PG diskette *)
F5	Block	Delete Block
F7	EEPROM	Delete EEPROM-module

Alt key and Function key

F1	Help	Activate help system
----	------	----------------------

Ctrl key and Function key

F3	Preset	Activate preset menu
F4	System	Shell to operating system

*)The lay-out of these keys may vary, depending on the computer configuration. (Preset of diskette drives see chapter 6.2.1.).

12.2 Initializing the Programmable Controller

F1

Function key F1 (PC) will initialize the programmable controller. In order to prevent any operator mistakes, the following question will be displayed after you have pressed the function key F1:

Y

Initialize PC
Initialize PC (Y/N)?

N

If you want to activate the initialization process, press the character key "Y" (for Yes). The initialization corresponds to the identical function Overall Reset which can be exercised on the PC. This function will clear and initialize all of the RAM. Please inform yourself, by reading the manual that came with your PC, in what mode the programmable controller will be after execution of the function "Overall Reset".

ESC

By answering the question with "No" (key "N"), the Reset will not take place.

The window will disappear and in the Message Line the message "Function aborted" will be displayed.

F10

This function can also be aborted using the ESC-key or function-key F10! The question for confirmation will disappear also in this case and the message will be generated as well.

12.3 Delete PG675-diskettes *)

F2

Function key F2 (PG675) will enable you to delete the entire contents of a PG675 diskette. The diskette must be in the corresponding drive (see chapter 6.2.1.). All of the saved Blocks, together with the matching Code, Doc, Comment and Preheader files will be deleted if this function is activated.

In order to prevent any operator mistakes, you will be asked the following question after having pressed function key F2:

Delete ?

delete the entire PG675 diskette (Y/N)?

Y

If you wish to delete the PG675 diskette, press key "Y" (for Yes). If the diskette has no PG675 format, then the execution will be aborted automatically.

N

By answering the question with "No" (key "N"), the deletion will not take place. The screen will disappear, and in the message line you will see the message "function aborted".

ESC

This function can also be aborted by pressing the ESC key or function key F10.

F10

In this case also, the window will vanish and the message will appear.

12.4 Delete PG685/635 program files *)

F3

Function key F3(PG685) will enable you to delete the program files of a PG685 diskette which must be in the corresponding drive (see chapter 6.2.1.). All of the saved Blocks, together with the matching Code, Doc, Comment and Preheader files will be deleted if this function is activated.

In order to prevent any operator mistakes, the following question will be displayed on the screen which will make clear how many files you have selected:

Delete ?

Delete 2 program file(s) (Y/N)?

Attention:
Please pay attention to the user definition while deleting PG685/635 diskettes.

Y

If you wish to delete the selected files, press character key "Y" (for Yes) and the deletion will be carried out. On the screen, the names of the files which are being deleted will be shown.

N

By answering the question with "No" (key "N"), the deletion will not take place. The screen will disappear and in the message line you will see the message "Function Aborted".

ESC

This function can also be aborted by pressing the ESC key or function key F10.

*)The lay-out depends on the arrangement of the diskette drives (see chapter 6.2.1.). The description in this chapter relates to the following
Preset: FDO = PG675FD1 = PG685

*)The lay-out depends on the arrangement of the diskette drives (see chapter 6.2.1.). The description in this chapter relates to the following
PresetFDO = PG675FD1 = PG685

F10 In this case too, the window will vanish and the message will appear.
 The deletion of a PG635 diskette is analogous to the afore-mentioned method, on condition that a PG635 drive has been installed and assigned

12.5 Delete Blocks

F5 Function key F5 (Block) enables you to delete Blocks, which were saved on either diskettes in PG635, PG675, PG685 or DOS format (depending on the Preset of the drives), on harddisk or in the PC.

You can enter the name of the block (if appl. including the search path) in the inserted window, or you can activate the directory function (see chapter 14.3) in case you wish to select more than one file.

Delete blocks:

-

In order to prevent any operator mistakes, the following question will be displayed that will inform you about which file or how many files you have selected:

Delete blocks :

Do you really want to delete the 002 selected file(s) (Y/N)?

Y If you wish to delete the selected Block(s) (files), press key "Y" (for Yes) and the deletion will be carried out. On the screen, the names of the Blocks which are being deleted will be listed.

N By answering the above mentioned question with "No" (character key "N"), the deletion will not take place.

ESC The screen will vanish and in the message line you will see the message "Function Aborted". This function can also be interrupted by pressing the ESC key or function key F10.

F10 When you delete blocks which were saved on either diskette or harddisk in DOS format, the deletion of the ASCII file will also delete the binary code file.

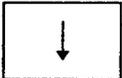
12.6 Delete EEPROM

F7

Function key F7 (EEPROM) will start a routine, with which you can delete all the data saved in an EEPROM.

When you activate an EEPROM for the first time, or activate it after you have changed a module, the MC5 module library which also contains the erasable EEPROM's, will be displayed (see chapter 20):

????????????????		
378-OAA11	1 * 2K	2K
378-OAA41	1 * 8K	8K
VIPA-LC11	1 * 2K	2K
372-OAA61	4 * 8K	16K
372-OAA62	4 * 8K	16K
373-OAA11	1 * 8K	8K
373-OAA21	2 * 8K	16K

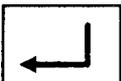


Selecting the EEPROMs is done by means of the cursor keys.



After confirmation by pressing the RETURN key, a window will be inserted, which contains specific information on the selected EEPROM:

<p>Please insert module and confirm</p> <p>Module code.....372-OAA61 capacity.....16 K organisation.....Word oriented, 1 page blocks.....4 * 2764 (per 8 KB) programming voltage 21 Volt</p> <p>please confirm with RETURN or abort with SC</p>



Before you begin, please test once again if your selection is correct. If this is the case, confirm your choice by pressing the RETURN key and the deletion will be carried out.

The process (deleting = overwriting with 0FFh) is shown on the screen. How much time the deletion process will take, depends on the density of the module. The end of the process is indicated by a sound signal.

Aborting the clear operation while in progress is not possible, and would not make any sense, the PG will regard a partly deleted EEPROM module as defective.

13. Special Menu

13.1 Activation and function key lay-out

F6

When you are in the Main Menu, function key F6 (Special) will activate the menu, and will display the following function key lay-out:

Function key lay-out Special Menu

F1	Start	PC cold restart
F2	Comp.	Compress memory of PC
F4	Stop	PC to stop state
F6	Preset	Activate the preset menu (Description in chapter 6)
F7	Format	Format diskettes

Alt key and Function key

F1	Help	Activate help system
----	------	----------------------

Ctrl key and function key

F3	Preset	Activate preset menu
F4	System	Shell to operating system

13.2 Start and stop the PC

Start of the PC

F1

Function key F1 (Start) will start the PC (restart). In order to prevent any operator mistakes, the following question will be displayed after you have pressed the F1 key:

Start of PC (Y/N)?

Y

If you want to start the PC, press key "Y" (for Yes). This start is identical to the function on the PC. Depending on the type of PC connected, the flags, timers, counters and the I/O image table can be deleted. Please inform yourself, by reading the manual that came with your PC, in which operation mode your PC will be after the function "start" is activated.

N

By answering the question with "No" (key "N"), the restart procedure will not be carried out. The window will disappear and you will see the message "Function aborted" in the message line.

ESC

This function can also be aborted by pressing the ESC key or function key F10.

F10

In this case too, the window will disappear and the message will be displayed.

Stop of the PC

F4

Function key F4 (Stop) enables you to bring the PC to a standstill (i.e. the processor has stoped). In order to prevent any mistakes, the following question will be inserted after you pressed the F4 function key:

Stop the PC (Y/N)?

Y

If you want to stop the PC, press key "Y" (for Yes). This stop procedure is identical to the manual function on the PC using the switches. When you have activated this function, it can be reversed by a Restart (on the PC or by using the function key F1 "Start").

N

By answering the question with "N" (key "N"), the PC will not stop. The window will disappear and you will see the message "Function Aborted" in the message line.

ESC

This function can also be aborted by pressing the ESC key or function key F10.

In this case too, the window will disappear and the message will be displayed.

F10

13.3 Compress memory

When you delete Blocks in the PC, they will remain in the PC-RAM (they will only be marked as "invalid"). During editing, the edited Blocks will be put in memory additional to their old invalid versions. So, these invalid Blocks take up memory of the PC as well.

F2

Function key F2 (Compress) enables you to compress the memory of the PC. Using this function, invalid old Blocks are deleted from the PC-RAM and valid blocks are optimally rearranged, so that more memory is available. During compression, the PC may not be in the Stop mode. In order to prevent any mistakes, the following question will be inserted after you have pressed the function key F2:

Attention:
The funktion "Compress PC is not supported by all PC's.

Compress PC (Y/N)?

Y

If you want to compress the PC, press the character key "Y" (for Yes).

N

By answering the question with "No" (key "N"), the PC memory will not be compressed. The screen will disappear and you will see the message "function aborted" in the message line.

ESC

This function can also be aborted by pressing the ESC key or function key F10.

F10

In this case too the screen will vanish and the message will appear. You do not have to wait until the compress procedure is finished. During compression you can continue to work with the MC5 program.

13.4 Formatting

When you activate this function, a second menu is displayed:

F1	PG...	PG drive ace.to preset
F2	PG...	PG drive ace.to preset
F5	DOS A	DOS drive A
F6	DOSB	DOS drive B:

The DOS drives are always listed, whereas the PG drives are only listed if they have been defined in the preset menu (see chapter 6.2.1.).

For formatting DOS diskettes, the MS-DOS program "FORMAT.COM" is used. This program must be included in the search path (the Path command in the AUTOEXEC.BAT). After activating a function, instructions will be displayed which you are advised to follow. As an example, the following describes the formatting of PG diskettes:

Format diskettes in PG format

The message "Please insert diskette in drive DR: and press RETURN" will appear on the screen. Insert the diskette in the drive that you have defined as the FDD-drive (e.g. Drive B:), and then press the RETURN key in order to initiate the formatting process. You will see on the screen which track is being formatted (0-39 or 0-79). Format errors are indicated by an error message. Before the format procedure of a PG675 diskette starts, MC5 will display the message: "Please enter label name (20 characters at most)". You can give your diskette a title (a label) with a maximum length of 20 characters. It is not absolutely necessary to enter this label. In order to start the format procedure, press the RETURN key.

14. Information menu

14.1 Activation and function key lay-out

F7

When you are in the main menu, function key F7 (Info) will activate the information menu, and will display the following function key lay-out:

Function key lay-out Information menu

F1	XRF	Cross	Reference functions
F2	Dir		Directory function Print
F3	Doc		blocks Memory Size
F4	Mem.size		of interrupt stack
F5	Istack	Display	of block stack
F6	Bstack	Display	of system parameters
F7	Syspar	Display	the address menu (for a
F8	Addres	Activate	,see chapter 16) descript

Alt key and Function key

F1	Help	Activate	help system
----	------	----------	-------------

Ctrl key and Function key

F3	Preset	Activate	preset menu
F4	System	Shell to	operating system

14.2 Cross Reference functions

For collecting information about your program there are three functions at your disposal:

- the Cross Reference List
- the I/Q/F-Plan
- the Program Overview

You enter the Cross Reference functions by pressing F1 in the Information Menu (XRF). Pressing F1 again (XRF-List) will take you to the Cross Reference List Menu, F2 (IQF-Plan) will access the I/Q/F-Plan Menu and F3 (Pr.Ovr.) will access the Program Overview Menu.

14.2.1 Cross Reference List

The Cross Reference List contains information about the usage of Operands and calls to Blocks. The Cross Reference function creates files. One file for every Operand type, one file containing a summary of all Operands and one file with information about the creation of the latest Cross Reference. The generated files can be listed on the screen or on a printer. Because the files are saved on hard disk or diskette in the ASCII-format you can also edit them with an external editor.

F1

To generate a Cross Reference List you press F1 (Create). The name of the file that will contain the summary is "OUTPUT.XRF". Next an entry window becomes available in which you enter a Block name, or by using wild characters select a group of Blocks. After entering wild characters or excepting an empty entry window a Directory Window is displayed on the screen for further file selection. After selecting the desired Blocks with the "Insert" key (INS or INSERT) all references are searched for, sorted and saved in the files explained before.

```

Info Cross-reference: Please choose the file to be displayed
Press: File name      Description
<CR> C:OUTPUT.XRF    Complete cross-reference list
A   INFO.XRF        Information about cross-reference list
B   OP_Q.XRF        Outputs
      OP_RI.XRF       Not found -System transfer data
      OP_RJ.XRF       Not found -System transfer data extended
      OP_RS.XRF       Not found -System data words
      OP_RT.XRF       Not found -System data words extended
G   OP_D.XRF        Data
H   OP_DB.XRF       Data blocks
      OP_DX.XRF       Not found -Data blocks extended
J   OP_I.XRF        Inputs
      OP_FB.XRF       Not found -Function blocks
      OP_FX.XRF       Not found -Funktion blocks extended
M   OP_F.XRF        Flags
      OP_OB.XRF       Not found -Organisation blocks
O   OP_P.XRF        Periphery
      OP_PB.XRF       Not found -Program blocks
      OP_O.XRF        Not found -Periphery extended
      OP_SB.XRF       Not found -Step blocks
S   OP_T.XRF        Timer
T   OP_C.XRF        Counter
      OP_S.XRF        Not found -Special flags

```

A character (A-U) in the column "Press" indicates the type of Operand that was found. In the column "Description" is explained what type of Operand it concerns and in the column "File name" the name of the file that has the information about the usage of the Operand. After entering the character the file shown in the column "File name" is displayed on the screen. Pressing the ENTER key results in a list of the file "OUTPUT.XRF" containing all references.

F2

Pressing function key F2 (Show) always gives the general review of the result of the latest Cross Reference. You can load and examine the files using the way explained before.

F3

Pressing function key F3 (Print) always gives the general review of the result of the latest Cross Reference. By entering the proper character you can print the files mentioned in the column "File name".

14.2.2 I/Q/F-Plan

F2

The I/Q/F-Plan function F2 (IQF-Plan) generates a file that contains an overview of Operands in a Block or a group of Blocks. The Plan gives information about what Bit in what Byte of Input, Output and Flag operands is used.

F1

To generate an I/Q/F-Plan you press F1 (Create). Next an entry window will become available in which you enter a Block name, or by using wild characters select a group of Blocks. After entering wild characters or excepting an empty entry window a Directory Window is displayed for further file selection. After selecting the desired Blicks with the "Insert" Key (INS or INSERT) all references are searcht for and the result is saved in the file "OUTPUT.IQF".

Significance of the indications of the I/Q/F-Plan.

- The Operand is still available.
- "Space" The Operand is used in a Byte, Word or Double Word instruction.
- ? The Operand is used as a Formal Operand (within an FB or FX).
- # The Operand follows a DO DW or DO FW command (indirect addressing).
- X This Bit of the Operand is used.

Byte	7	6	5	4	3	2	1	0	B	W	D	Byte	7	6	5	4	3	2	1	0	B	W	D
0	-	-	-	-	-	x	-	-	-	-	-	1	x	-	x	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
4	-	x	-	x	x	x	x	x	-	-	-	5	-	-	?	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	9	-	-	-	?	-	-	-	-	-	-	-
10	x	x	-	x	x	-	x	-	-	x	-	11	x	x	x	-	-	-	-	-	-	-	-
12	-	-	-	-	-	-	#	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-
16	-	?	?	-	-	-	-	-	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	#	-	-	-	-	19	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	x	21	x	x	-	-	-	-	-	-	-	-	-
22	-	x	-	-	-	-	x	-	-	-	-	23	-	-	x	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-	-	-	-	-	-	-
124	-	-	-	-	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-	-	-	-	-
126	-	-	-	-	-	-	-	-	-	-	-	127	-	-	-	-	-	-	-	-	-	-	-

F2

Pressing F2 (Show) always gives the result of the latest I/Q/F-Plan.

F3

Pressing F3 (Print) will print the result of the latest I/Q/F-Plan to the output device assigned in the Preset.

14.2.3 Programm Overview

F3

The Program Overview function presents the structure of the User Program.

The Program Overview comprises three parts:

- A list of all selected Blocks and their length in words.
- A list of all Block types showing the total length in words for each type of the selected Blocks.
- The Program Overview display in which call nesting of the individual Blocks, starting from Blocktype OB is indicated. The maximum nesting depth shown depends on the Printer Presets 'Number of characters per line' and 'Left margin' and can be up to level 13.

F1

To create a Program Overview you press F1 (Create). Next an entry window will become available in which you enter a Block name, or by using wild characters, select a group of Blocks. After entering wild characters or accepting an empty entry window, the Directory Window is displayed for further file selection. After selecting the desired Blocks with the "Insert" Key (INS or INSERT) or space bar a selection can be made on the type of overview to create:

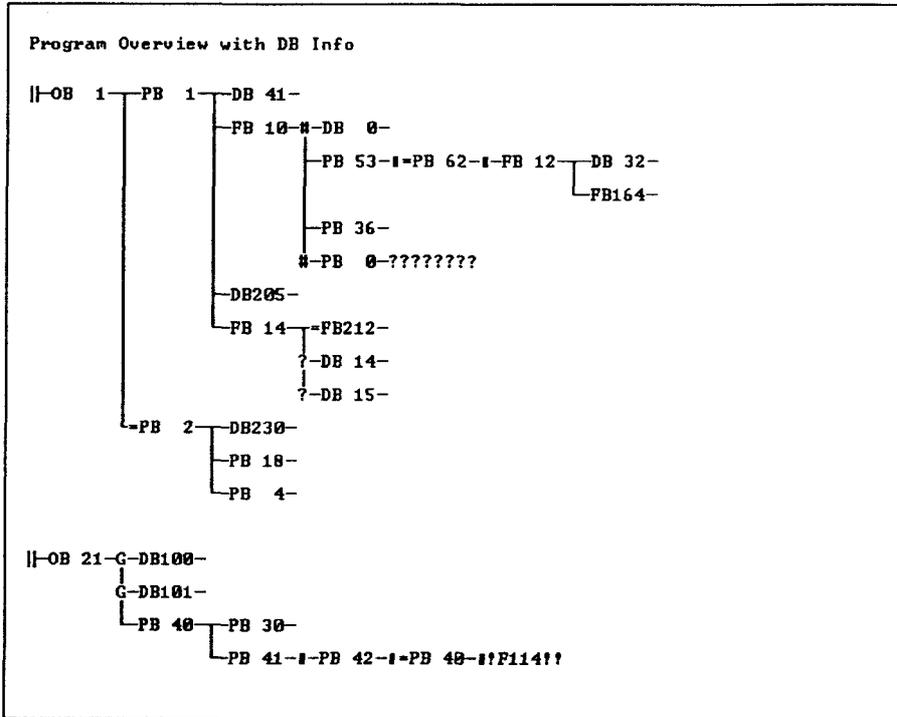
- 1: Program Overview without Data Block calls displayed
- 2: Program Overview with Data Blocks calls displayed.
- 3: Program Overview without Data Blocks calls displayed and additionally examining Standard Function Blocks.
- 4: Program Overview with Data Blocks calls displayed and additionally examining Standard Function Blocks.

Significance of the identifiers of the Program Overview:

- Block is called unconditionally: JU (unconditional jump) C DBxxx.
- = Block is called conditionally: JC (conditional jump).
- + Normal MC5 statement.
- G Generation of a Data Block: G DBxxx (generate Data Block).
- ? Parameter of Format Operand.
- # The operand follows a DO DW or DO FW command (indirect addressing of a Block).
- ????? The Block which has been called does not exist or was not selected for examination.

!F113! Error indicating that the maximum nesting depth that can be displayed was reached.
 !F114! Error indicating that a recursive Block call was detected.
 (The same Block called more then once in the same branch or the tree structure giving a risk of infinity in the User Program).

Example:



F2

Pressing F2 (Show) always gives the result of the latest Program Overview created.

F3

Pressing F3 (Print) will print the result of the latest Program Overview to the output device assigned in the Preset.

14.3 Directory function

14.3.1 General

F2

The Directory function is not only a function belonging to the information menu (activated by pressing function key F2: DIR). It also simplifies entering file names in other menus.

Right from the start, the Directory function gives you the opportunity to enter the search path (e.g. FDO:, PC:, AAMC5, ..), and use wildcards (e.g. *.SEQ, FB*, ?B*) so you can look at the contents of a specific directory or a list of specific files from the current directory. The function is activated after pressing the RETURN key.

If you confirm an entry field which holds no information by pressing the RETURN key, you automatically activate the Directory function for the current directory .

After activation of the Directory window, the file names and the subdirectory names together with the information about file size, date and time will be displayed. If you have selected "Directory extended" in the preset menu (see chapter 6.2.2.) the Directory window for FDO/FD1 diskettes and PC contains the following information: Block identification, Size, Name and LIB-Nr..

Files with certain extensions have no meaning in the MC5 programming package. DOS files with the following names will not be displayed:

- | | | |
|------|------|------|
| .EXE | .CNF | .COM |
| .LIB | .MC5 | .OBJ |
| .S5 | .SYM | .SYS |

MS-DOS directory window

216232, 216232		INFO DIRECTORY			
Line	Col	File name	Size	Date	Time
		..	Dir.	28.01.92	10:31:34
		db10	* 238	31.01.92	11:03:48
		fb10	* 180	30.01.92	18:31:18
		fb11	* 172	06.02.92	12:13:30
		fb222	* 474	07.02.92	09:55:52
		pb1	* 180	07.02.92	10:22:30
		pb9	* 152	30.01.92	18:21:32
		pb10	* 330	07.02.92	10:09:26
		pb11	1212	06.02.92	20:08:10
		pb12	1212	30.01.92	13:08:36
		info .xrf	759	07.02.92	10:23:50
		op_c .xrf	946	07.02.92	10:23:56
		op_d .xrf	53	07.02.92	10:23:50
		op_db .xrf	53	07.02.92	10:23:52
		op_f .xrf	389	07.02.92	10:23:54
		op_i .xrf	389	07.02.92	10:23:52
		op_p .xrf	105	07.02.92	10:23:54
		op_q .xrf	494	07.02.92	10:23:50
		op_t .xrf	1879	07.02.92	10:23:56

F1
F2
F3
F4
F5
F6
F7
F8 Print

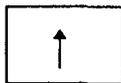
PG diskette
directory
window

198328, 198168		INFO DIRECTORY		FD1:?????????		1
Line	1	Col				
	Block		Size	Name	Libnr	
	DB 110	*	98		5098	
	FB 100	*	128		30010	
	FB 112	*	2604		14021	
	FB 113	*	78		14021	
	FBDO.112		2779			
	FBDO.113		141			
	OB 21	*	24		23051	
	OB 22	*	24		23051	
	DU 110	*	188			
	FK 112	*	12100			
	FK 113	*	110			
	FV 100	*	20			
	FV 112	*	764			
	FV 113	*	14			
	OK 21	*	46			
	OK 22	*	46			
	OU 21	*	8			
	OU 22	*	8			

F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 Print

The Asterisk character (*) behind the file name indicates that the corresponding Block could be compiled and that it was also saved as a binary file.

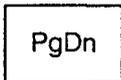
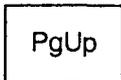
Operations in the directory window



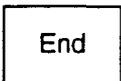
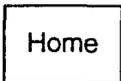
- You move the indicator by means of the cursor keys (and) by one position upwards or downwards.



By means of the cursor keys PgUp or PgDn, you can move one window page up or down.



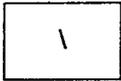
Using the keys Home and End respectively, the marker will jump to the beginning or to the end of the directory.



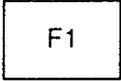
When you press a character key (e.g. character F) the indicator will jump to the first file beginning with this character (in our example F). The second time a character is typed (e.g. character A) the indicator jumps to the first file that has this character at the second position (in our example; begins with FA).

Alpha
numera
keys for
file search

The search command is entered at the top of the directory window and can be extended as described before. As input to the search specification, only character and numerical combinations are valid that are available in this directory. The program will ignore any other key that is pressed. The search specification can be deleted character by character by either using the DEL or the Backspace key. You can switch off the search function by either pressing one of the cursor keys (and), the Home/End key, or the PgUp/PgDn keys after which the top line of the directory is restored.

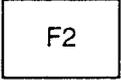


Entering this character is only effective in DOS directories. Entering a backslash (\) makes the cursor jump to the first sub-directory name. These entries can be found at the end of the directory window, and are arranged in alphabetical order.

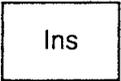


If it is allowed to select more than one file, the function key bar offers the following options:

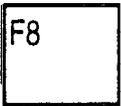
F1	Sel. All	Select all
F2	Des. All	Deselect all files



If it is possible to select more than one file, then use the "Ins" key or the space bar for selecting these files after you have moved the indicator with the cursor keys to the desired file name. The selected file names are displayed in inverse characters. To deselect separate files press the "Ins" key again. F2 discards all selections and deselects all files.

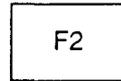


Function key F8 (Print) prints the contents of the currently displayed directory.

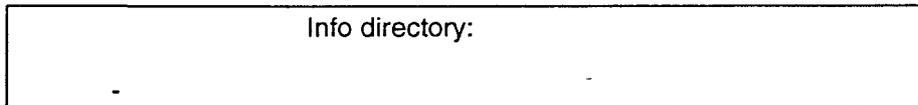
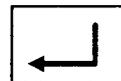


14.3.2 Function "Dir" in the Info Menu

The function "Info directory" enables you to change from one directory to another, and see or print its contents.



When you press function key F2 (Dir) in the Information Menu, the following entry window comes available:



When you accept the empty window by pressing the RETURN key, the contents of the current directory will be shown (selection possibilities see chapter 14.3.1).

You can move the indicator using the cursor keys and in this way you can select a directory name (for cursor positioning see chapter 14.3.1). When you confirm the selection of a directory name by pressing the RETURN key its contents will be displayed. Within the function "Into Dir" it is not possible to select a file by pressing the RETURN key, the function will be aborted and you will return to the Information Menu.

14.3.3 Directory function with entering file names

If the program expects you to enter a file name in an entry window, you can simplify this action by using the directory function. All you have to do is confirm the empty entry window by pressing the RETURN key, or select a specific directory by entering a directory name (see chapter 14.3.1).

In some menus, you can use the directory function to select more than one file. In this case you can select all files by pressing function key F1 (Sel. all) and discard the selected files by pressing function key F2 (Des. all).

Selecting one or more files from the current directory is done by pressing the "Ins" key. With this key you select the file on which the cursor is positioned. The selected file will be displayed with inversed characters. You can deselect any file by pressing the "Ins" key once more (see chapter 14.3.1).

14.4 Function DOC: Print Blocks

F3

With function-key F3 (DOC) you activate a function that enables you to list files on a printing device. The list may be directed to a printer or to a file.

The printer-output depend on the Presets:

- Print (see chapter 6.2.5)
- Symbolic (see chapter 6.2.4)

For Printing Blocks there are basically three types of listings.

- Characters per line= Normal print (80 characters)

A listing is generated with 80 characters per line. The list of the Symbolic Reference List is always printed after the corresponding Segment.

- Characters per line= Compressed print (132 characters)
Listing Symbolic reference = After Segment

A listing is generated with 132 characters per line. The list of the Symbolic Reference List is printed after the corresponding Segment.

- Characters per line= Compressed print (132 characters) Listing
Symbolic reference = Next to Segment

A listing is generated with 132 characters per line. The list of the Symbolic Reference List is always printed next to the STL program. With CSF or LAD the list is printed next to the corresponding Segment if the Segment is not too wide, otherwise the list is printed underneath the corresponding Segment. How to create a Title block file or Page footer file is described in chapter 8.3.6. The use of a Title block file or Page footer file has to be defined in the Preset (see chapter 6.2.5).

F1

After pressing F1 (Print) the following entry window will appear on the screen:

Print block(s)

-

In this entry window you can enter a Block name (file name), with a search path if necessary, or you can use the directory function for selecting several files (see chapter 14.3). During printing, information on the printing process will be displayed on the screen.

When you press "ESC" the printing will be interrupted after the last line that was send has been printed.

14.5 Information on the memory size

The Info function Memory Size will inform you about the memory capacity, and memory configuration of the PC. The addresses are displayed in hexa-decimal format. For more information on this subject please refer to the manual of the connected PC.

F4

After pressing the function key F4 (Mem.size) the following hexa-decimal addresses of for example a PC 150 U/S will be displayed on the screen.

F12-S5 154936 Bytes Free INFO MENU

Memory configuration

PC RAM configured to 100h

PC memory assigned to 73Fh

F1	F2	F3	F4	F5	F6	F7	F8
XRF	Dir	Doc	Mem.size	Istack	Bstack	Syspar	Address

14.6 Display of the Interrupt stack

The Information function "Interrupt stack" can only be activated, when the PC is switched to the "Stop" mode. In case this was caused by a software error, you can use the Interrupt Stack information to find the reason of the error.

After pressing function key F5 (Istack), the list of the control bits will be displayed. Set bits will be marked with "X". After pressing a key, the marked control bits will be explained in clear texts. After you pressed a key an other time the Interrupt Stack will be displayed.

F5

Please consult your PC manual for the meaning of the abbreviations used on the control bits. The following pictures are an example for the PC 150 U/S.

```

CONTROL BITS
NB      PBSSCH  BSTSCH  SHTAE  ADRBAU  SPABBR  MAUAS  QUITT
NB      NB      NB      REMAN  NB      NB      NB      NB
STOZUS  STOANZ  NEUSTA  NB      BATPUF  NB      BARB  BARBEND
X      X      X      X      X
NB      UAFEHL  MAFEHL  EOVH   NB      AF      NB      NB
ASPNEP  ASPNRA  KOPFNI  PROEND  ASPNEEP  PADRFE  ASPLUE  RAMADAN
KEINAS  SYNFEH  NINEU   NB      NB      NB      SUMF  URLAD

press any key to continue ...
    
```

```

CONTROL BITS - Messages in text
STOZUS: PC in stopped state
STOANZ: PC stop display (red LED)
BATPUF: Power supply equipped with backup battery for RAM-memory

press any key to continue ...
    
```

```

M5-S5 159936 Bytes Free (INFO MENU)
I N T E R R U P T - S T A C K   LEVEL: 1
Stmnt : <can't be reconstructed>
Stm-reg: 0000h   SAZ:   06D8h   DB-Add. : 010Ah
Blk-Stp.: 5E07h   PB-nr. : 010   DB-nr.  : 010
           Rel-lin: 0000h

ACCU1: 0064     ACCU2: 0000

Result code:    ANZ1  ANZ0  OVFL  CARRY  ODER  STATUS  OKE  ERAB
                X          X          X          X          X          X

Stop cause:    STOPS  SUF  TRAF  MNM  STS  STUEB
                NAU  QUZ  ZYK  PEU  BAU  ASPFA

F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8
XRF | Dir | Doc | Mem.size | Istack | Bstack | Syspar | Address
    
```

14.7 Display of Block Stack

The Block Stack represents the nesting of the activated blocks. Running a program, every time a Block is left the following entries will appear:

BLOCK.-NR.	Block number
BLOCK.-ADDR.	Block address
RETURN-ADDR.	Absolute return address of a Block to calling Block
REL.-ADDR.	Relative return address (the difference between the absolute return address and the start address of the calling block)
DB-NR. DB-ADDR.	Number of the opened DB Start address of the selected DB at the time of the call.

F6

When you press function key F6 (BStack), the following screen will be displayed:

```

M5-S5 163064 Bytes Free (INFO MENU)
B L O C K   -   S T A C K
Block.-Nr.  Block.-Addr.  Return-Addr.  Rel.-Addr.  DB-Nr.  DB-Addr.
OB  1      0504h         0504h         0000h

F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8
XRF | Dir | Doc | Mem.size | Istack | Bstack | Syspar | Address
    
```

14.8 Display of System Parameters

Using the information function for the System Parameters you can obtain information on the internal memory organization and revision of the PC. The addresses will be displayed in hexa-decimal format.

F7

After pressing function key F7 (Syspar), the following parameters are displayed on the screen of for example a PC 115U:

MS-95 159236 Bytes Free INFO MENU							
System parameters							
I/O module inputs	0h	Length of DB-List	200h				
I/O module outputs	0h	Length of SB-List	200h				
Process image inputs	6300h	Length of PB-List	200h				
Process image outputs	6380h	Length of FB-List	200h				
Flag memory	6100h	Length of OB-List	200h				
Timer memory	5F00h						
Counter memory	6000h						
SD-area in PC-PROM	5D00h	Length of DB0-list	0h				
PC software release	U 0.2	System parameter exp.	FF01h				
User memory end address	40FFh	Block header-length	Ah				
System program memory	0h	CPU-Ident.	0h				
		PGAS-software release	U 0.0				
PC-Type:	PC 100 U / CPU 95						
F1	F2	F3	F4	F5	F6	F7	F8
XRF	Dir	Doc	Mem.size	Istack	Bstack	Syspar	Address

15. Test menu

15.1 Activation and function key lay-out

The Test Menu contains sub-menus to test complex programs or individual Blocks. In some cases changing of variables (e.g. process variables) is possible.

You can enter the Test Menu from the Main Menu by pressing function key F8 (Test). The following function key lay-out will then be displayed:

Function key lay-out

F5 Cntr.Var	Controll/change of process variables
F6 Control	Control/change of output variables
F7 Stat.Var	Status of process variables
F8 Status	Status of Blocks

Alt key and Function key:

F1 Help Activate help system

Ctrl key and Function key:

F3 Preset	Activate preset menu
F4 System	Shell to operating system

15.2 Control variables. Status variables

15.2.1 Operation and function key lay-out

F5

You can activate the sub-menu "Control Variables" in the Test Menu by pressing function key F5 (Cntr.Var).

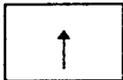
F7

By pressing function key F7 (Stat.Var) you activate the sub-menu "Status Variables". After the start of these functions, the status of the variables is displayed always at the end of each PC cycle.

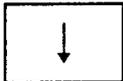
Both functions have a similar function key lay-out:

Function key lay-out

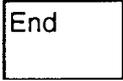
F1	Start	Start update (PC)
F2	Save	Write list of variables to file
F3	OP-Dei	Delete current entry line
F4	OP-Insert	Insert new entry line at cursor position
F8	Load	Load a file (List of variables)



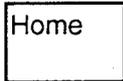
The key combination Ctrl and the cursor-right key moves the cursor to the last character of the current character string, whereas the key combination Ctrl and the cursor-left key will move the cursor to the first character of the character string.



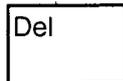
Upon leaving the current line, a syntax check of the entries will be carried out. In case there are invalid or incorrect entries a message will be displayed. Leaving the line is only possible when it contains valid entries.



When you press the End key the cursor will jump to the last character of the current line.

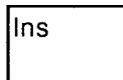


The cursor will move to the first character after you pressed the Home key.

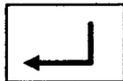


The backspace key enables you to delete the character left of the cursor, the delete key will delete the character positioned on the cursor.

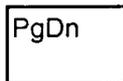
By pressing the Insert key, you can insert characters on the place where the cursor is positioned.



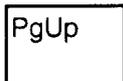
When you press the RETURN key the cursor will move to the next line. When you leave the line, a syntax check on all the entries will be carried out. Invalid or incorrect entries will be rejected, and you will get an error message. Leaving the line is only possible when it contains valid entries.



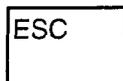
The PgDn/PgUp keys enable you to leaf through the window pages. The



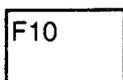
current page number will be shown in the top line of the window.



The ESC key will cancel functions and will take you back to the edit functions or to the previous menu.



The function key F10 will take you back to the edit functions or to the previous menu.



15.2.3 Creating and loading a list of variables

The sub-menus "Control Variables" and "Status Variables" are evoked using standard function keys. The cursor is positioned on the first line of the column "Operand" here you start to enter the operands whose states you wish to check.

With the operand types D, DL, DR, DW, DD, the corresponding Data Blocks must be entered before the definition of the operands, otherwise the message "DB does not exist" will appear in the column "Value".

The program will enter an appropriate format upon leaving the line. The format may be changed but is dependent upon the operand type. The following list offers an overview of the types of operands and their appropriate formats. The default formats are listed first, the options are listed between brackets.

Operand	Valid formats
F,1,Q	KM
T,C,D	KM
FY,IB,QB,DL,DR	KH (KM, KY, KS, KF)
DW,FW,IW,QW	KH (KM, KY, KS, KT, KZ)
FD,ID,QD,DD	KH (KM, KY, KS, KF, KG)
T	KT (KM, KY, KS, KF, KH, KC)
C	KZ (KM, KY, KS, KF, KH, KT)
DB	—
COM	ANY DESIRED COMMENT TEXT (STARTING AT COLUMN "FORMAT" TO A MAXIMUM OF 51 CHARACTERS)

F3

Function key F3 (Op-Del) enables you to delete the current line (the line with the cursor), whereas function key F4 (OP-Insert) enables you to insert an empty line above the current line.

F4

In this way you can insert operands in an existing list (on condition that there is sufficient page capacity left).

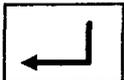
Comment
COM

By entering COM" in the column "Operands", you can add a comment line with any desired text. You have a maximum of 51 characters at your disposal starting at the column "Format".

Save list of operands

F2

The operand list created with this menu, can be saved as a file. When you press function key F2 (Save), an entry window will appear on the screen. The entry field contains the default name CTRL.VAR (or STAT.VAR).



You can either accept this name by pressing the RETURN key, or enter another name and than press the RETURN key. If this file name does not exist yet, it will be created in the current directory of the program. Such a file can contain up to 20 pages.

Save operands as

STAT.VAR

If a file with this name already exists in the current directory, after you confirmed your entry by pressing the RETURN key the following question will appear on the screen .

Y

Overwrite file (Y/N)?

original file should not be overwritten, press key "N".

N

The screen will disappear, the file has not been saved. You can now activate the function "Save" again, and enter another file name.

Load the list of operands

F8

A Variable file (list of operands), created with the function "Save" can be loaded again using function F8 (Load) any time you like. Current entries will be overwritten. When you press function key F8 (Load), an entry window will appear on your screen. The entry field contains the default file name CTRL.VAR (or STAT.VAR).



You can either confirm this name by pressing the RETURN key, or enter another name before confirmation. This file name will then be the default file name.

Load operands from

CTRL.VAR

15.2.4 Start Status scan

F1

Function key F1 (Start) activates the scanning of the statuses. If you have made any changes in the sub-menu "Control Variables", these changes will be transferred to the PC. In the top line of the window the message "Write to PC" will be inserted. The marking of the changed values in the column "Ace" will disappear.

When the transfer has been carried out, the current mode of the PC will be displayed "PC scanning" or "PC halted". In the menu "Status Variables" the mode will be displayed immediately, because a change of values is not possible.

F5

Apart from the display of the current PC mode, a blinking circle indicates that the status scan has been activated.

At the same time the edit functions are blocked and the function key lay-out will change.

F10

Function key F5 (Edit) will restore the edit functions. In order to end or abort the status display, you can also press function key F10 or the ESC key.

ESC

The signal state of the operands is shown in the column "Value". The status currently displayed, is always the actual status at the end of each PC cycle.

The screen displays "Control Variables" and "Status Variables" after the start of the status display.

S5 18144 Bytes Free TEST Control Variables								
Control Variables		Occupied: 60%	Page: 1	PC scanning				
Operand	Format	Value	Acc					
COM	Flag Area							
FW 100	KF	216						
FW 10	KM	00000010 00000001						
FY 126	KH	00						
COM	Data block info							
DB 10								
DW 3	KH	00E6						
DW 10	KS	S5						
COM	Delay timers							
I 0	KT	002.0						
I 1	KT	Timer halted!						
I 6	KT	012.1						
I 7	KT	007.1						
I 9	KT	Timer halted!						
F1	F2	F3	F4	F5	F6	F7	F8	
				Edit				

S5 18456 Bytes Free TEST Status Variables								
Status Variables		Occupied: 60%	Page: 1	PC scanning				
Operand	Format	Value	Acc					
COM	Flag Area							
FW 100	KF	222						
FW 10	KM	00000010 00000001						
FY 126	KH	00						
COM	Data block info							
DB 10								
DW 3	KH	00E6						
DW 10	KS	S5						
COM	Delay timers							
I 0	KT	Timer halted!						
I 1	KT	Timer halted!						
I 6	KT	030.1						
I 7	KT	Timer halted!						
I 9	KT	Timer halted!						
F1	F2	F3	F4	F5	F6	F7	F8	
				Edit				

When the edit function are released, the last statuses displayed in the column "Value" will remain visible. Text messages (such as TIMER HALTED!) will be replaced by data.

15.3 Controlling outputs

15.3.1 Operation and function key lay-out

F6

Function key F6 (Control) enables you to activate the sub-menu "Control Outputs" from the Test Menu. With the help of this function you can directly set outputs to a signal state. As this function is only active when the PC is in the "Stop" mode, the changes will not affect the I/O image table or the program run.

With this function, the outputs of a PC can be controlled separately. The assignments to the switching circuits of the corresponding plant can be checked. Missing or defective output modules are recognized.<+>

The menu "Controlling Outputs" has the following function key lay-out:

Function key lay-out

F1 Start Start controlling (Outputs)
 F2 Save Saving list of variables (Outputs) to a file
 F3 OP-Del Delete entry line
 F4 OP-Insert Insert empty line at the position of the cursor
 F8 Load Load a file (list of variables)

Alt key and Function key

F1 Help Activate help system

Ctrl key and Function key

F3 Preset
 F4 System

Activate preset menu Shell to operating system

15.3.2 Screen displays and operation

Controlling output modules

TIS-S5 062400 Bytes free TEST - Control of I/O-modules			
Control Outputs		Occupied: 15%	Page: 1
Operand	Format	Value	Acc
QW 12	XM	01011101	X
QB 3	XM	10101011	X

F1	F2	F3	F4	F5	F6	F7	F8
Start	Save	OP-Del	OP-Insert				Load

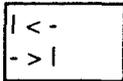
The number of entries on every screen is limited in the first place by the number of available lines, and secondly by the number of bytes that can be collected from the PC at once. When these limits have been reached, a message will be displayed and further entries (apart from changes) can not be made on this page.

The first line of the "Control Outputs" window contains information on the activated function, the occupied space of the current page (in %), and the page number (from 1 to 20). The screen is divided into four columns. By editing or loading of a list of variables the process variables are entered in the column "Operands". Changes in presentation can be made in the column "Format", but depends on the type of operand.

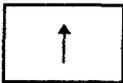
In the column "Value" changes can be made on the value of the operand (within the valid range). Changed values are marked by the program, they automatically receive the character "X" in the column "Ace" (Accept). The marked operands are written into the PC when you start this function. You cannot edit in the column "Ace".

Operation

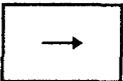
After pressing the tabulator key, the cursor will jump to the next column in the same line.



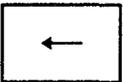
If it is not possible to edit in this column, then this function will be blocked. When arrived at the end of the line, the cursor will return to the first column in the same line. The jump back to a previous column is achieved by pressing the shift key and the tabulator key at the same time.



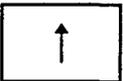
In order to move the cursor within a column, you must use the cursor keys.



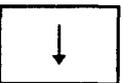
The direction of the cursor corresponds to the direction of the cursor-keys.



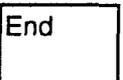
The key combination Ctrl and the cursor-right key moves the cursor to the last character of the current character string, whereas the key combination Ctrl and the cursor-left key will move the cursor to the first character of the character string.



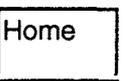
Upon leaving the current line, a syntax check of the entries will be carried out. In case there are invalid or incorrect entries a message will be displayed. Leaving the line is only possible when it contains valid entries.



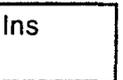
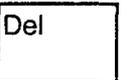
When you press the End key the cursor will jump to the last character of the current line.



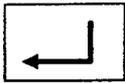
The cursor will move to the first character after you pressed the Home key.



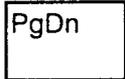
The backspace key enables you to delete the character left of the cursor, the delete key will delete the character positioned on the cursor.



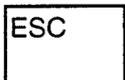
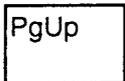
By pressing the Insert key, you can insert characters on the place where the cursor is positioned.



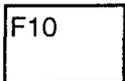
When you press the RETURN key the cursor will move to the next line. When you leave the line, a syntax check on all the entries will be carried out. Invalid or incorrect entries will be rejected, and you will get an error message. Leaving the line is only possible when it contains valid entries. The PgDn/PgUp keys enable you to leaf through the window pages. The



current page number will be shown in the top line of the window.



The ESC key will cancel functions and will take you back to the edit functions or to the previous menu.

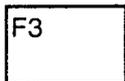


The function key F10 will end functions and will take you back to the edit functions or to the previous menu.

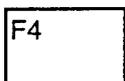
15.3.3 Creating and loading an Output Control list

The sub-menu is evoked using standard function keys. The cursor is positioned on the first line of the column "Operand" here you start to enter the output operands whose states you wish to change.

The program will enter the KH format upon leaving the line in the column "Format". The format may be changed but is dependent upon the operand type.



Function key F3 (Op-Del) enables you to delete the current line (the line with the cursor), whereas function key F4 (OP-Insert) enables you to insert an empty line above the current line.

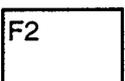


In this way you can insert operands in an existing list (on condition that there is sufficient page capacity left).

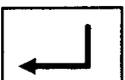
Comment
COM

By entering "COM" in the column "Operands", you can add a comment line with any desired text. You have a maximum of 51 characters at your disposal starting at the column "Format".

Save list of operands



The operand list created with this menu, can be saved as a file. When you press function key F2 (Save), an entry window will appear on the screen. The entry field contains the default name CTRL.IO.



You can either accept this name by pressing the RETURN key, or enter another name and than press the RETURN key. If this file name does not exist yet, it will be created in the current directory of the program. Such a list can contain up to 20 pages.

Save operands as
CTRL.IO

If a file with this name already exists in the current directory, after you confirmed your entry by pressing the RETURN key the following question will appear on the screen .

File exists !
Overwrite CTRL.IO ? (Y/N)

Y

If you wish to overwrite this file, confirm this by pressing key "Y". If the original file should not be overwritten, press key "N".

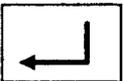
N

The screen will disappear, the file has not been saved. You can now activate the function "Save" again, and enter another file name.

Load the list of operands

F8

A variable file (list of operands), created with the function "Save" can be loaded again using function F8 (Load) any time you like. Current entries will be overwritten. When you press function key F8 (Load), an entry window will appear on your screen. The entry field contains the default file name CTRL.IO.



You can either confirm this name by pressing the RETURN key, or enter another name before confirmation. This file name will then be the default file name.

Load operands from
CTRL.IO

15.3.4 Start Control

F1

Function key F1 (Start) will the controlling of the outputs. This function can only be activated when the connected PC is in the "Stop" mode. Otherwise the function will be aborted together with an error message. If controlling is possible, the message "Control Outputs" will be displayed on the top line of the window.

AIS-S5 067400 Bytes free TEST - Control of I/O-modules			
Control Outputs		Occupied: 15%	Page: 1
Operand	Format	Ualue	Acc
QW 12	KM	01011101 01001001	X
QB 3	KM	10101011	X

F1	F2	F3	F4	F5	F6	F7	F8
Start	Save	OP-De1	OP-Insert				Load

The entered values will be transferred to the outputs. If the list contains any output values which can not be transferred, you will see the message "Invalid process interface module" in the column "Value" of the corresponding line. After this editing in the column "Value" is no longer possible until the operand is changed.

15.4 Status Block

15.4.1 Activation and function key lay-out

F8

You can activate the sub-menu "Status Block" by pressing function key F8 (Status). The status of the current Block will then be displayed.

Function key lay-out "Status Block"

F3	Search	Move cursor to search definition
F4	Replace	Replace search definition by other definition
F5	Repeat	Repeat Search or Replace function
F6	Mark	Mark block in the current file
F7	Copy block	Insert block at the cursor position
F8	Status	Start status scan of Block

Alt key and Function key

F1	Help	Activate help system
F3	Save block	Save block as an MS-DOS file
F4	Read block	Read block (file) at the position of the cursor
F5	Delete block	Delete marked block
F8	Print	Print the current tile or the marked block

Ctrl key and Function key

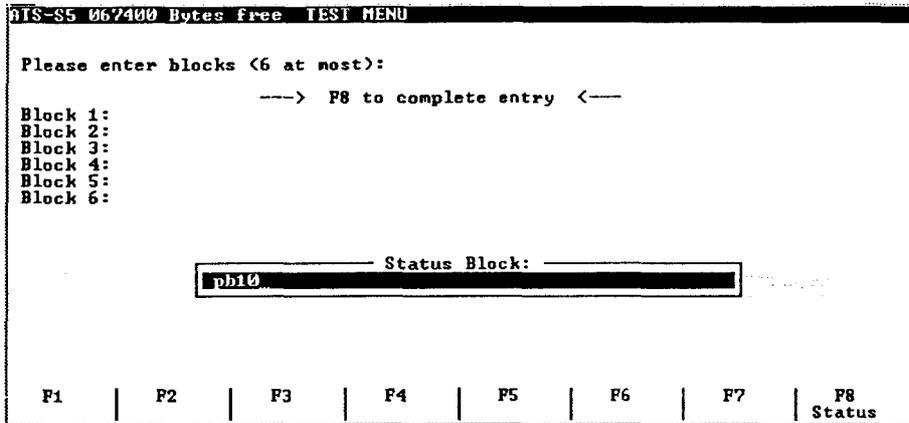
F1	Compile	Compile the currently loaded file
F3	Preset	Activate preset menu
F4	System	Shell to operating system
F8	CSF	Switch to CSF

15.4.2 Screen display and operation

F8

After pressing function key F8 (Status), the screen for the function "Test Status Block" will be displayed:

"Status Block" window (Input)



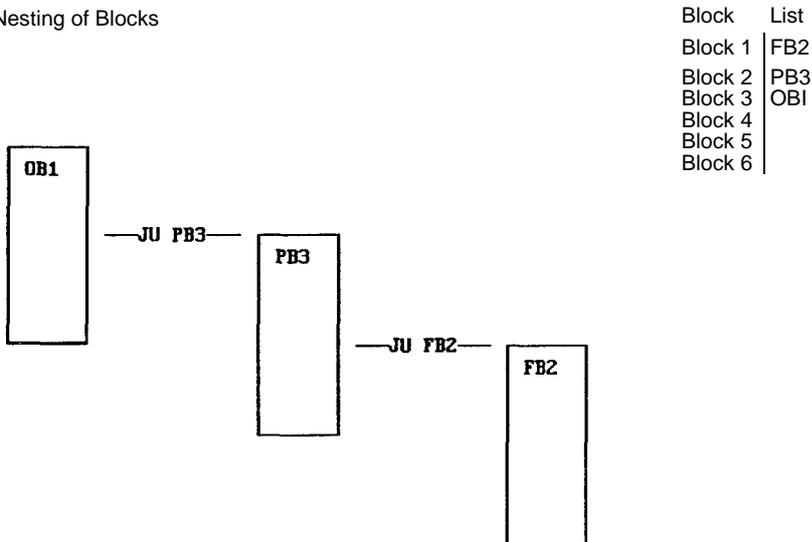
Enter the name of the Block you wish to test in the entry window and confirm your entry by pressing the RETURN key.

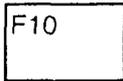
The name of the Block will be displayed as being "Block 1" when it is available in the connected PC, otherwise an error message will be displayed in the same line.

If a block is used more than once in the program, you can select the order (nesting order) by which the file has to be called. The nesting order of the Blocks can be selected by entering the corresponding Block names in the lines "Block 2" to "Block 6". The order must correspond to the nesting order (see example). It is possible to nest up to 5 Blocks deep.

Nesting of Blocks

EXAMPLE





OR



You will end the input, by either pressing function key F10 or by accepting an empty entry window by pressing RETURN. When you have done this, the first selected block will be loaded for testing.

If the Block loaded from the PC exists also in the current directory on the harddisk, it will be displayed the way it was created with MC5 (referring to symbolic addressing, comments etc.)

Status Block window with loaded Block

```

MIS-S5 062400 Bytes free STBIUS BLOCK OIL)
Rel. Line  Column  Address  Label  Comment
000B0      :<
000B2      :<
000B4      :L   FW 4
000B6      :L   DW 0
000B8      :!=F
000BA      :>
000BC      :O   Q 0.1
000BE      :>
000C0      :A   F 100.1
000C2      :=   Q 0.1
000C4      :***
000C6      :A   Q 1.1
000C8      :L   DW 12
000CA      :SD  I 11
000CC      :NOP 0
000CE      :NOP 0
000D0      :NOP 0
000D2      :A   I 11
000D4      :A   I 1.3
000D6      :=   F 101.1
000D8      :***
F1  | F2  | F3  | F4  | F5  | F6  | F7  | F8
Switch | Search | Replace | Repeat | Mark | Block Cpy | Status
    
```

PgUp

15.4.3 Preparing the output status

PgDn

The position of the cursor determines the starting point of the status scan.

F3

For positioning the cursor you can use the cursor-down key and cursor-up key , and the PgUp/PgDn keys.

F5

You can move and position the cursor extremely fast and accurate by using the function keys F3 (Search) and F5 (Repeat).

Alt

These are the same functions that are available in the editor.

The key combination AIVF8 (Print) will start the print-out of the current Block.

F8

If you only want a partly printout of the Block, you must mark this range beforehand by means of function key F6 (Mark).

Using the ESC key you can abort all functions, and return to the previous menu.

ESC

Function key F10 will end all functions, and make you return to the previous menu.

Attention:
For Editor functions which use key combinations, see chapter 8.1

F10

You have several other editor functions at your disposal, comparable with those of the Word-Star™ Editor. A list of these functions is shown in the editor description in chapter 8.1.

15.4.4 Function "Status"

Function key F8 (Status) will activate the status scan of a Block from the position of the cursor.

F8

Some commands interrupt the status display, because the program jumps into the PC system or into other Blocks (e.g. the commands BEC, JU etc.).

"Status Block" window with status display PC115U

Address	Command	Signal	status	display	GO	-GO	-GO	-G	Fl-Switch	block
015BE	:A<	1			2004	0000			00000011	
015C0	:O<	0			2004	0000			00000001	
015C2	:L FW 4	0			0000	2004			00000001	
015C4	:L DW 0	0			0035	0000			00000001	
015C6	:?F	0			0035	0000			01000000	
015C8	:>	0			0035	0000			01000000	
015CA	:O Q 0.1	0	0 000						01000000	
015CC	:>	0			0035	0000			01000100	
015CE	:A F 100.1	0	0 000						01000000	
015D0	:= Q 0.1	0	0 000						01000001	
015D2	:****	0			0035	0000			01000001	
015D4	:A Q 1.1	0	0 000						01000000	
015D6	:L DW 12	0			2025	0035			01000000	
015D8	:SD T 11	0	000.0	halted					01000001	
015DA	:NOP 0	0			2025	0035			01000001	
015DC	:NOP 0	0			2025	0035			01000001	
015DE	:NOP 0	0			2025	0035			01000001	
015E0	:A T 11	0	000.0	halted					01000000	
015E2	:A I 1.3	0	0 000						01000000	
015E4	:= F 101.1	0	0 000						01000001	
015E6	:****	0			2025	0035			01000001	
015E8	:A I 1.3	0	0 000						01000000	
015EA	:AN F 45.3	0	0 000						01000000	

When the status scan has started the second line in the window shows:

- DBADD:**
 - The number of the current DBs, 0000 if no DB has been called or when the DB address does not points to a DB.
- RLO:**
 - The result of the logical operation
 - The status of the Bit-operand (I/Q/F)
- STATUS/AKKU1:
AKKU2**
 - The status of the operands Contents of Akku1 after command execution Contents of Akku2 after command execution
- Status**
 - The signal status of the operands

Instead of the offset address the absolute PC address will be displayed. The comment field will be replaced with the status display.

If an instruction or segment is not handled by the program, a corresponding message will be displayed on the right side of the instruction.

If you want to interrupt the status output, press any key. If the cursor is moved one line, or if you change the display for a whole window page, the offsets and status display will be refreshed.

15.5 Function Status" in CSF/LAD

The function "Status Block" is used in CSF and LAD basically in the same way as in STL. After entering the Block list, you have most of the editor functions at your disposal.

After pressing function key F8 (Status) the status scan will be activated.

If the Segment is bigger than the screen, you can move the segment vertically and horizontally by means of the cursor keys. During the scanning of the Block, the status will be displayed in accordance with the colour presets of the Preset/Special Menu.

Parameters of Compare, Timer, and Counter Gates will be displayed in or next to the Gate.

16. Address Menu

16.1 Activation and function key lay-out

The Address Menu is a sub-menu of the Information Menu. You can access the Information Menu from the Main Menu by pressing function key F7 (Info), and enter the Address Menu from there by pressing F8 (Address).

F7

When you have activated the menu, the program will automatically display the entry window for the new address (see chapter 16.3), and the function key lay-out of the Address Menu.

F8

Function key lay-out Address Menu

F1	Address	Choose new memory range
F2	Scroll	Display of memory range is refreshed starting from the position of the cursor.
F3	Edit	Enable or disable data input
F4	Undo	Undo changes byte wise (word wise)
F6	Mark	Mark memory range
F7	Fill	Fill memory range
F8	Print	Print memory range

Alt key and function key

F1	Help	Activate help system
F2	Write	Transfer changes to PC
F4	Delete	Delete list of changes

Ctrl key and function key

F3	Preset	Activate preset menu
F4	System	Shell to operating system

16.2 Screen display and handling

The screen of the Address Menu gives you representation of the memory of the PC. A hexadecimal representation of the memory and an ASCII representation are displayed next to each other.

Byte wise representation (empty memory)

ATS-S5 114584 Bytes free INFO ADDRESS																	
Address hex	Hexadecimal dump												ASC-Dump 0123456789ABCDEF				
	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B		+C	+D	+E	+F
E900	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E910	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E920	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E930	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E940	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E950	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E960	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E970	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E980	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E990	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9D0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....
E9F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	.....

Number of bytes changed: 0 Editing not permitted

F1	F2	F3	F4	F5	F6	F7	F8
Address	Scroll	Edit	Undo	Mark	Fill	Print	

Word wise representation (empty memory)

ATS-S5 114584 Bytes free INFO ADDRESS									
Address hex	Hexadecimal dump								ASC-Dump .0.1.2.3.4.5.6.7
	+0	+1	+2	+3	+4	+5	+6	+7	
0000	0000	0000	0000	0000	0000	0000	0000	0000	.....
0008	0000	0000	0000	0000	0000	0000	0000	0000	.....
0010	0000	0000	0000	0000	0000	0000	0000	0000	.....
0018	0000	0000	0000	0000	0000	0000	0000	0000	.....
0020	0000	0000	0000	0000	0000	0000	0000	0000	.....
0028	0000	0000	0000	0000	0000	0000	0000	0000	.....
0030	0000	0000	0000	0000	0000	0000	0000	0000	.....
0038	0000	0000	0000	0000	0000	0000	0000	0000	.....
0040	0000	0000	0000	0000	0000	0000	0000	0000	.....
0048	0000	0000	0000	0000	0000	0000	0000	0000	.....
0050	0000	0000	0000	0000	0000	0000	0000	0000	.....
0058	0000	0000	0000	0000	0000	0000	0000	0000	.....
0060	0000	0000	0000	0000	0000	0000	0000	0000	.....
0068	0000	0000	0000	0000	0000	0000	0000	0000	.....
0070	0000	0000	0000	0000	0000	0000	0000	0000	.....
0078	0000	0000	0000	0000	0000	0000	0000	0000	.....

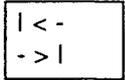
Number of bytes changed: 508 Editing not permitted

F1	F2	F3	F4	F5	F6	F7	F8
Address	Scroll	Edit	Undo	Mark	Fill	Print	

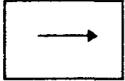
The maximum range of a window page is 128 addresses (word wise representation) or 256 addresses (byte wise representation). In the left column of the window, the address of the memory range is displayed, the middle part contains the corresponding Hex-dump, and the right part of the window contains the corresponding ASCII-dump. The memory is displayed either byte wise or word wise, depending on the type of PC. The last line of the window contains information on the number of changed bytes, and the edit status.

In order to prevent you from making mistakes, the Address window is accessed in the status "Editing not permitted". This means that you cannot change a memory value or fill a memory range. The edit mode can be enabled by pressing function key F3 (Edit). All functions are available in this mode (see chapter 16.5).

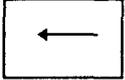
Operation



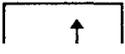
By pressing the tabulator key, the cursor will jump from the Hexa-decimal field to the ASCII field, when it is used again it will jump back to the hexa-decimal field.



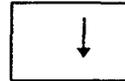
If you want to move the cursor in the hexa-decimal field or the ASCII field, you can use the cursor keys.



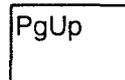
The direction of the arrow corresponds to the movement of the cursor.



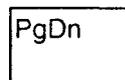
At the end of the page, the program will skip 16 lines forwards or backwards.



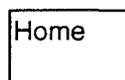
The cursor will be in the next position. You can not move beyond address 0000.



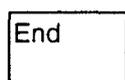
The PgUp/PgDn keys will change the address display with 16 lines (one page) backwards or forwards.



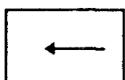
You can not go beyond address 0000. The cursor remains in the original position.



When you press the Home key, the cursor will jump to the first address of the current page.



By pressing the End key the cursor will jump to the last address of the page.



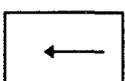
All the changed addresses are kept in an internal buffer. Undoing of changes takes place in reverse order of entering. Undoing changes is only possible if they have not been save yet (loaded into the PC). Undoing takes place byte wise (or word wise) using the backspace key. The number of changed bytes will decrease correspondingly in the indication.

Warning!

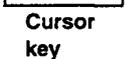
If already changed addresses are changed again, these changes can only be retrieved when the list has been deleted up to the corresponding entry.



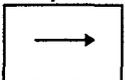
Some functions will activate an entry window. Addresses and values must be entered in the hexa-decimal format. The corresponding function will only be executed if you confirme your entry by pressing the RETURN key.



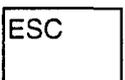
The entries can be made by using the keyboard, and can be deleted before you leave the line by using the backspace key ().



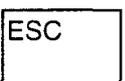
By pressing the cursor key, the previous entry in the entry window will (character wise) be displayed again.



Incorrect entries in the entry window are recognized by the program. The window can only be left by entering either a hexa-decimal value or by pressing the ESC key.



If you have activated a function by accident, you can abort this function by pressing the ESC key (with some functions, this will take some response time).



16.3 Select memory range

F1

By activating the Address Menu or pressing function key F1 (Address), the following window will be displayed:

Address
hex: 0000

The hexa-decimal address at the beginning of the page is default. When you activate the Address Menu address 0000 is default. The default address can be overwritten by entering a hexa-decimal address.



After confirmation by pressing the RETURN key, the Address window will be (re)displayed (see chapter 16.2). The selected address will be shown in the first line of the screen. If the function is aborted by means of the ESC key, the displayed address range will remain intact.

F2

After pressing the function key F2 (Scroll) the address at the cursor will instantly (without confirmation) become the first displayed address.

16.4 Change values

16.4.1 Changes by using the keyboard (Edit)

F3

The Address Menu will be activated with the default mode "Editing not allowed". Because of this, undesired changes are impossible. Function key F3 (Edit) switches the edit mode to "Editing allowed". This status is displayed in the last line of the window.

In the "Editing allowed" mode, the memory contents can be changed with the help of function key F7 (Fill), or by means of the alpha numerical keyboard. You may edit in both areas, the hexa-decimal field and the ASCII field. Changes are displayed in both areas.

The edited addresses will be high-lighted. In the last line of the window the number of currently changed bytes will be displayed. Changes will be valid after you have saved them in the PC before this they can be undone, deleted or rewritten before being saved, (see chapter 16.4.3).

Warning!

If already changed addresses are changed again, these changes can only be retrieved when the internal buffer of the program has been deleted up to the corresponding entry.

16.4.2 Fill memory range

F7

If you want to assign the same value to a range of memory addresses, you can simplify this action by using function F7 (Fill). This function can only be executed in the mode "Editing allowed". The function "Fill" can be applied in both the hexa-decimal field, and in the ASCII field. Changes will be displayed in both areas.

The changed addresses will be high-lighted. In the last line of the Address window the number of currently changed bytes will be displayed. Changes will only be valid after they have been saved. They can be recalled, deleted or rewritten before they are saved, (see chapter 16.4.3.). There are three ways to select the range that has to be changed.

- Press the function key F7 (Fill) and the following entry window will be displayed on the screen:

F7

Fill the range
Start:
End:



The hexadecimal addresses for the start and end address may be confirmed by pressing the RETURN key, or may be changed beforehand. The default start address is usually the first address of the current page. The default end address of the range to be filled is the address last on the page.

After confirming the end address, the entry window of the value you want to use for filling, will be displayed:

Value?
0000



Addresses and values must be entered in hexa-decimal notation, incorrect entries will be recognized by the program. The entry window can only be left after you have entered a hexadecimal number, or after you have pressed the ESC key.

F6

Mark the beginning and the end of the desired range by using function key F6 (Mark, Mark end) and afterwards press function key F7 (Fill).

F6

You will immediately see the entry window for the "Value".

F7

The changes will only be valid after confirming the entry by pressing the RETURN key.

F7

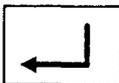


F6

- Mark the beginning of the desired range by using function key F6 (Mark) and afterwards press function key F7 (Fill).

F7

- First the entry window for the end address will be displayed and than, after you have confirmed your entry by pressing the RETURN key, the entry window for the "Value".



- Here too the changes will only be accepted when you confirm the entry by pressing the RETURN key. If the range that you wish to fill exceeds the maximum number of possible changes, an error message is displayed. The message will also tell the size of the filled range. After you have confirmed this message, the cursor will jump to the last filled page. The remaining memory range that has not been filled yet, will default be marked as the next range to fill with the following till operation.

16.4.3 Recalling and saving changes

If you have changed values of the memory by editing or filling but did not saved them, you can recall or overwrite these changes.

Overwrite changes

F3

Changed (high-lighted) values can be rewritten later on. In order to do this, you must select the mode "Editing allowed", and move the cursor to the desired position. The entries can only be made by the keyboard. The function "Fill" can not be used to overwrite changes.

Undo changes

F4

Changes that have not yet been saved can be recalled with function key F4 (Undo) either byte wise or word wise (depending on the PC). The undo operation is independent of the cursor position. Because all changes are kept in an internal buffer undoing takes place in reverse order. The previous entry will again be displayed on the screen, and the number of changed bytes will diminish correspondingly in the read-out.

Warning!

If already changed addresses are changed again, these changes can only be retrieved when the internal buffer of the program has been deleted up to the corresponding entry.

Delete changes

Alt

In case all changes that have not been saved should be recalled, you can use the function "Delete" (function keys Alt/F4).

F4

The internal list of changes will be deleted completely. The original entries will be displayed again, and the indication for the number of changed bytes will return to zero.

Save

Alt

No sooner as when you press function keys Alt/F2 (Save) will the changes be transferred to the memory of the PC.

F2

The operation will start immediately. If the PC releases the memory, the changes are saved. If you try to change a protected memory area, or when saving is not possible for other reasons, an error message will be displayed:

Transfer error!
abort with ESC.

ESC

The program will try repeatedly to save the edited data in the PC, the number of tries will be shown briefly. If the function is aborted pressing the ESC key, the message "Operation aborted by user" is displayed for a short while. There may be a delay of up to 15 seconds after each message. This delay has no influence on the success or failure of the operation.

16.5 Marking a memory range

F6

Function key F6 (Mark, Mark End, Mark Del) allows you to mark a memory range (max. 4096 Bytes) for printing, or to fill it with the same value.

F6

Move the cursor to the start address of the range you wish to mark, you can use both the hexa-decimal area or the ASCII area. By pressing function key F6, you mark the start address with a "greater than" symbol (»). F6 is changed to the function "Mark End", the keyboard lay-out will change accordingly (Mark End).

F6

Move the cursor to the last address of the range you wish to mark (in the hexa-decimal or the ASCII area). By pressing function key F6, you mark the end address. The selected range is displayed in inverse characters. F6 is switched to the function "Delete Marker", the keyboard lay-out will change accordingly (MarkDel.).

If you press function key F6 again, the marking of the memory range will be released.

16.6 Print memory

F8

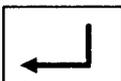
By means of function key F8 (Print) you can print the contents of all memory or partly. Before activating this function you should check whether you have selected the correct printer settings in the preset menu (see chapter 6). In this case the preset of the option "Symbol Comments" has no meaning. When you did not select the use of a Title Block file, the system will automatically add the header "MC5 programming package, Information Address/Print Addresses Page xxxxx" with the appropriate page number to the listing.

You have three ways to select the range that you want to print:

F8

- Press the function key F8 (Print), and the following entry field will be inserted in the screen:

Address print
Start :
Finish:



The hexadecimal addresses for the start and the end can be confirmed by pressing the RETURN key, or can be changed before confirmation. The default start address is usually the first address of the current page. The default for the end address is the address last on the page. After you have confirmed the end address, the printing will start.

Addresses must be entered in the hexadecimal notation. Incorrect entries will be recognized by the program. The entry window can only be aborted after you have entered a hexadecimal number or after you have pressed the ESC key.

F6

- Mark the beginning and the end of the desired range by using function key F6 (Mark, Mark End), and then press function key F8 (Print).

F6

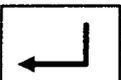
- The printing will start immediately.

F6

- Mark the beginning with the desired range with function key F6 (Mark) and press F8 (Print) next.

F8

- The Entry Window is displayed for entering the end. Printing will start after the End Address is confirmed with RETURN.



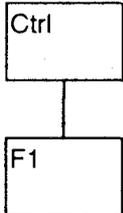
ESC

During printing the print-out currently sent to the printer will be displayed on the screen. Printing can be aborted at any time by pressing the ESC key. When printing has ended the original page will be displayed again. The cursor position is not changed.

17. Compiling Blocks

17.1 General

Every time a Block is saved to a FDO/FD1 diskette, PC, or EEPROM, the Block will be compiled. Doing this, unavailable or double jump labels will be detected and jump distances tested. Also mistakes in the nesting-depth and in the symbolic addressing will be recognized and reported.



Apart from this, you can activate the function Compile" in the Editor Menu yourself by pressing the Ctrl key and the function key F1 (Compile) at the same time.

It will be compiled until the first detection of a mistake, after which an error message follows. If this error message is confirmed by pressing a key the cursor will jump to the line and position containing the mistake.

The rules for compiling files and the two-step compile procedure will be explained in the following pages.

17.2 Rules for saving files

17.2.1 Saving to FD or EPROM/EEPROM

The following rules should be regarded while compiling Blocks:

- Empty lines without comments will not be compiled
- Empty lines will be compiled to instruction "BLD 130" (=Empty Line).
- If you use special characters in the comment area, in additional comment lines, or in the jump labels (e.g. ,?,G,), these characters will be compiled as blanks.
- If a Segment contains several comment lines, they will be assigned to the corresponding segment at the time of compiling. When loading from FD: all comment blocks of a segment will be gathered and put at the beginning of the segment.
- Comments on instruction lines will only be saved on a FDO up to the 32nd character.
- If a Block has no LIB-number, the program will generate a LIB-number from the system date.
- When a Data Block containing repetitive factors is compiled, they will be removed at the moment of compilation.

17.2.2 Loading from FD or EPROM/EEPROM

While loading files the following should be considered:

- All additional Blocks belonging to a Blocks, should be loaded. For Block FB10 for instance, this could be the following Blocks:

```
FB10      instructions)
FK10      comments)
FV10      jump labels)
FBD0.010  additional comment lines)
```

- If there is no Block Preheader available (e.g. FV10) or the Block Preheader does not contain all of the necessary jump labels, they will be created by the MC5 programming package.
- The generated jump labels all have the first character "M"; followed by three hexa-decimal numerals that are extracted from the offset of the jump labels.

For example:

```

                                Block # FB2
                                BLKNAME # TEST
                                LIB # 6032
0000A      : JU = M00C
0000C M00C : JU = M00E      1st generated label at offset 00Ch
0000E M00E : BE             2nd generated label at offset 00Eh
```

17.3 PASS 1/PASS 2

The Compile function of the MC5 programming package consists of two steps.

The compilation status is displayed in the message line of the screen. Errors that are detected during compilation will be shown by in clear text messages, and the compile function will be aborted.

PASS1:

- Testing of the instruction syntax
- Creation of jump labels and formal operands
- Testing of the nesting-depth and resolving of the bracket levels of Data Blocks.
- Checking the Segments length.

PASS 2

- Checking of the jump distances
- Checking on the use of Formal Operands
- Checking if there is only one "BE"-command used in the Blocks FB, SB, OB, PB, and if this is the last instruction of the Block.
- Creation of the instruction codes

18. PG-Drives, PG-Diskettes

In order to use PG-diskettes, you will need the following drives and diskette types:

PG675 diskettes

5,25" drive, 360 KB
5,25" diskettes, format: DS DD,
48 TPI(tracks per inch)

PG685 diskettes

5,25" drive, 1,2 MB
5,25" diskettes, format: DS QD, or DD,
96 TPI(tracks per inch)

PG635 diskettes

3,5" drive, 720 KB
3,5" diskettes, format: DS, DD,
135TPI (tracks per inch)

You must assign the physical drives of the computer to the PG drives, and with PG635/PG685 select a user number and program file in the preset menu.

Since working with PG diskettes highly depends on the hardware, we have listed some points that may be helpful in case of failures.

Disk controller

The disk controller must be able to work with a transferrate of 125 Kbit/s (like the original IBM AT03). IBM compatible computers often have a higher transferrate. In these cases a controller with a transferrate of 125 Kbit/s must be build in, e.g. the Western Digital WD1003-WA 2 or WD1006V-MM2.

PG675 diskettes

PG675 diskettes have a disk format of 180 KB. In order to work with these diskettes, you will need a 360 KB drive which is able to work with 180 KB formatted diskettes. Very good results have been obtained with the TEAC 55B drive. The PG675 is equipped with this drive.

Other drives may cause problems which can not be corrected by assigning in the "SetUp" a 360 KB drive.

Attention:
Switch to the preset menu by pressing the Ctrl key and the function key F3 simultaneously.

19. Symbolic Addressing

The MC5 programming package simplifies programming by using symbolic addressing. You can use symbolic names for the addressing, and assign symbol comments to these symbolic names at the same time.

Symbolic addressing can be used for all operands and block types, except for documentation blocks and comment blocks.

If you want to use symbolic addressing, you must create a symbols file, or convert one from the PG685/635 format. You also have to select the preset "symbolic" in the preset menu (see chapter 6.2.4).

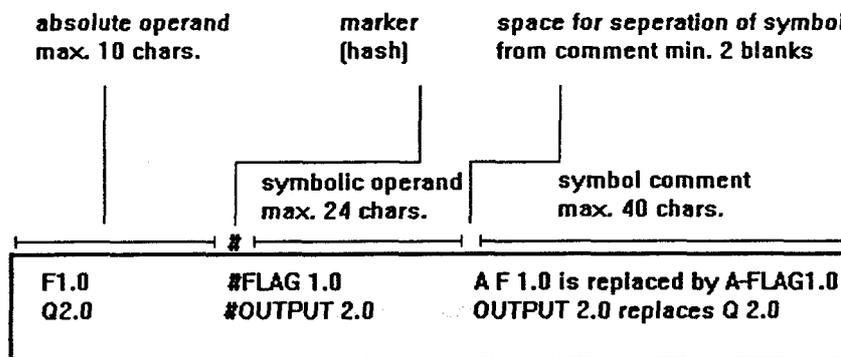
Attention!

Blocks which were loaded in the editor ranges 01-16 before they were assigned to the symbolic addressing; must be updated by means of the function "update" (Ctrl F2 in the editor menu).

Create symbols file

A symbols file can be created with any ASCII editor (for the MC5 editor, see chapter 8). The operands of the symbols file have an overall function and are available in every block. If you want to edit a symbols file with MC5, it must be have the following format:

Format of a symbols file



The symbolic operand may contain separate blanks. Two or more blanks in succession mark the end of the symbolic operand.

The MC5 program is able to process up to 5460 operands, which corresponds to a DOS file of approximately 300 KB.

It is possible to have comment lines with the character; at the beginning of the line within the symbols file. They will be lost during the transfer to PG format, as clear comment lines can not be created here.

Name of the symbols file

Presets

If you saved the thus created ASCII file under DOS, you must enter the file name as the symbolic name in the preset menu (see chapter 6.2.4.). After you have left the entry window, the symbols file will be transferred to an internal format. Lines which contain errors will be displayed.

After a faultless compilation, a file under the same name with extension SYM will be created. This file will only be used internally for symbolic addressing.

"Use symbols file:Yes"

The selected symbols file is valid for all edited blocks.

"Use symbols file:No"

This choice enables you to display the block together with the absolute operands, without deleting the name of the symbols file.

"Symbolic addressing:Yes"

The pre-selection "Yes" is only possible when the option "use symbols file: Yes" has been selected. When you enter an absolute operand in one of the instruction lines, it will be replaced by the symbolic name when you leave the line. Symbolic names can also be entered directly.

"Symbolic addressing:No"

If you enter a symbolic name in one of the instruction lines, it will be replaced by the assigned absolute operand upon leaving the line. If you load a block with symbolic names into the editor menu while this pre-selection is active, these names will be transformed into the corresponding absolute operands when the assignments have been defined, and when they are available (as far as MC5 is capable of doing this).

Symbolic save: Yes

The ASCII version of a Block will be saved with Symbolic Operands instead of Absolute Operands. This may be a way of 'Rewiring' Blocks

Symbolic save: No

Blocks will not be saved with Symbolic Operands

Listing symbolic reference

You may choose to have the Symbolic Reference List printed next to the Segment or after the corresponding Segment.

20. Working with EPROM/EEPROM modules

You can activate the EPROM module by using the adaptor card. EPROM modules bear the marking EP: in the drive selection.

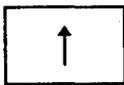
Basically there is no difference between using the EPROM module and using e.g. the PC: or A:. However, notice the fact that blocks in EPROM cannot be overwritten.

In the Preset "Online" the Addressing mode of the EPROM (byte/word wise) is to be configured. Additionally, when programming an EPROM to be used in a PC 155U, the corresponding switch in the Preset must be set to "Yes".

In order to process an EPROM module, it is necessary to select the right module. The program notices whether the module has been changed, and activates if necessary a module select function.

Module selection

When you are activating the device EP: for the first time (e.g. with the Directory function from the Information menu), or after you have changed EPROM modules, the selection of the modules will be made by means of a selection window. The last selected module is indicated by means of an inverse marking.

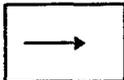
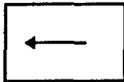


The selection of the desired modules is made with the help of the inversed marking, which can be moved by means of the cursor keys and .

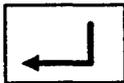


If you press the cursor keys or, an additional window containing extensive information on the selected module will be inserted.

The window will disappear when you press a key.



You must confirm the selection of the module by; pressing the RETURN key.



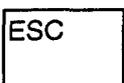
The program will check whether the marking of the module corresponds to the hardware marking.



For safety reasons, the information window will be inserted once more. Please check whether the inserted module corresponds to the description, and confirm this again with the RETURN key. Without confirmation, you can return to the module selection window by pressing the ESC key. If the marking on the module does not correspond to the hardware marking, the module selection window will be inserted again.



You can abort the module selection by pressing the ESC key.



Warning!

The list of the supported modules (MC5 module library) will show that in some cases the hardware marking is not exclusively assigned to the EPROM modules. It is therefore important to test whether the right module has been selected! The EPROM can be destroyed by a wrong selection!

A change of EPROM module can only be ascertained in case the module marking does not equal 63 (3F hexa-decimal notation).

Listing of the MC5 module library

Module name Voltage		Size	Marking	
372-OAA61	4	* 8KB=16KW	13	21 V
372-OAA62	4	* 8KB=16KW	25	13V
			5	
373-OAA11	1	* 8KB= 8KB	3	21 V
373-OAA21	2	* 8KB= 16KB	2	21 V
373-OAA22	2	* 8KB=16KB	25	13V
			5	
373-OAA31	3	* 8KB=24KB	1	21 V
373-OAA41	4	* 8KB=32KB	0	21 V
373-OAA42	4	* 8KB=32KB	25	13V
			5	
373-OAA61	4	* 16KB=32KW	4	21 V
373-OAA62	4	* 16KB=16KW	25	13V
			5	
373-OAA81	4	* 32KB = 64KW	25	13V
			5	
373-1AA41				
373-1AA61				
373-1AA81				
374-OAA11	1	* 2KB = 2KB	55	OV
375-OLA11	1	* 8KB= 8KB	3	21 V
375-OLA15	1	* 8KB= 8KB	3	21 V
375-OLA21	2	• 8KB=16KB	2	21 V
375-OLA31	1	*16KB=16KB	6	21 V
375-OLA41 (VIPA 7727)	4	*16KB=32KB	4	21 V
375-OLA51	1	*32KB = 32KB	25	13V
			5	
375-OLA61	2	* 32KB = 64KB	5	13V
375-OLA71				
375-OLC11	1	* 2KB = 2KB	55	OV
375-OLC21	2	* 2KB = 4KB	54	OV
375-OLC31	1	* 8KB = 8KB	53	OV
375-OLC41	2	* 8KB=16KB	52	OV
375-OLD11				
375-OLD21 (VIPA 7628)	1	* 16KB=16KB	24	OV
375-OLD31 (VIPA 7629)	1	* 32KB = 32KB	28	OV
(VIPA 7636)	4	* 32KB = 64KW	30	OV
375-1LA15				
375-1LA21				
375-1LA41				
375-1LA61				
375-1LA71				
375-8LA11				

375-1 LC11				
375-1LC21				
376-OAA11	2* 8KB=	8KW	15	21 V
376-OAA12	2 * 8KB =	8KW	25	13V
			5	
376-OAA21	2*16KB=	16KW	6	21 V
376-OAA22	2*16KB=	16KW	25	13V
			5	
376-OAA31 (VIPA 7635)	2 * 32KB =	82KW	7	13V
(VIPA 7599)	2 * 32KB =	32KW	15	13V
377-OAA31 (VIPA 7630)	2 * 32KB =	32KW	31	OV
378-OAA11	1 * 2KB =	2KB	55	OV
378-OAA41	1 * 8KB =	8KB	53	OV
987-OAA11	4* 8KB=	32KB	0	21 V
VIPA 7599				
VIPA-LC11	1 * 2KB =2KB		53	OV

21. Language translation.

21.1 Translating Blocks.

MC5-program initially programmed in one language can be translated without much difficulty into the other language supported by MC5. To do this, the user has two options:

-Translation on the hard disk.

The user has to make sure that of all the Blocks he want to translate a compiled version ('.MC5'-file) is available on the hard disk. If this is not the case, the file has to be created by loading the Block into the editor, then Compile (Ctrl-F1) and Save (F2) it. When all Blocks are compiled, the ASCII-version of the Blocks (the files with no extension) have to be removed from the current directory. Next the Preset (F6 Special/F6 Preset/F8 Special) has to be adjusted and saved. When MC5 is now restarted, the language will be changed and the Blocks will be available in the other language.

-Translation via PG-disk.

When a lot of files or a whole project have to be compiled it may be easier to transfer the Blocks to a PG-compatible disk. This way all Blocks that do not have a compiled version will be compiled and the compiled file will be stored on hard disk. After adjusting and saving the Preset to the desired language you can remove the ASCII-files from the current directory and restart MC5. The Blocks will now be available in the other language.

21.2 Translating the Symbol-file.

The Symbol-file has to be translated separately. For this purpose the program 'SYMTRAN.COM" is supplied with the package.

SYMTRAN

SYMTRAN type file [file] type:
when type = e assume file is in English
when type = g assume file is in German

EXAMPLE 1:

SYMTRAN e mysymbol.dat

This will translate the file MYSYMBOL.DAT from ENGLISH into GERMAN. The results will (by default) be written into a file named SYMTRAN.CNV.

EXAMPLE 2:

SYMTRAN g g_symbol.txt esym.dat

This will translate the file G_SYMBOL.DAT from GERMAN into ENGLISH. The results will be written into a file named ESYM.DAT.

22. Additional MC5 facility programs

22.1 Indexing very large Symbol files (externally to MC5)

Upon entering a Symbol file in the Preset of MC5 an indexed version of this file is generated, the '.SYM' file. With very large Symbol files there may not be enough memory space left to generate an index on this file. In these situations we advise you to switch-on XMS support. (Please refer to chapter 6.2.6).

When your computer does not support XMS memory (because of lack of memory or you are not running MS-DOS 5.0 or higher, see chapter 2.7), you need to generate an index on the Symbol file externally to the MC5 environment.

As part of the MC5 package you will find the program SYMKONV.EXE to perform this task. In this process a backup of the original Symbol file will be created with the extension '.BAK'. After the index file has become available, you must enter the Symbol file in the Preset. When entering the name of the Symbol file in the Preset, MC5 will find an index file of a later date and time than the Symbol file itself and will therefore not try to index it again.

Example:

You want to generate an index of the Symbol file:
mysym@z0.SEQ

You also want messages in the English language. To do this you type at the MS-DOS command line: symkonv -e mysym@z0.SEQ

22.2 Removing double spaces In Symbol names

Some of the latest Siemens packages allow the programmer to create Symbol files with two or more successive spaces in Symbolic names. At the time of writing this facility is not supported by MC5. This may result in many error messages on double use of Symbols when entering such a Symbol file in the Preset.

As part of the MC5 package we have included the program SYMADAP.EXE. This program will search through a Symbol file for the existence of two (or more) of the same adjoining user-defined characters and replace these with another user-defined character. The search and replace will always be consistent, so that tree 'search-characters' will be replaced by tree 'replace-characters', two by two, etc.

SYMADAP enables you to automatically search for all double spaces in the Symbols and replace them by an other character. In this process a backup of the original Symbol file is created with the extension '.ORG'.

Please note that apart from the double spaces in Symbolic names, the structure of the Symbol file has to agree with the MC5 rules.

Example:

The double spaces of the Symbols of Symbol file 'MYSYM—Z0.SEQ' have to be replaced by an underscore (_). You start SYMADAP as follows:

```
symadap mysym@z0.seq / /_
```

SYMADAP.EXE also allows you to perform the reverse operation:

```
symadap mysym@z0.seq /_ /
```

APPENDIX

Appendix

Connector 25 pin Cannon for VIPA MC5 Interface

PIN	Function	Comment
1	—	
2	GND	signal mass
3	K3S	TTL Baudrate coding
4	K2S	TTL Baudrate coding
5	RxD	V.24 Receive
6	+RxD	TTY Receive
7	DSR	V.24 Data Set Ready
8	-RxD	TTY Receive
9	CTS	V.24 Clear to Send
10	+TxD	TTY Send
11	TxD	V.24 Send
12	RTS	TTY Send
13	RTS	V.24 Request to Send
14	—	
15	DTP	V.24 Data Terminal Ready
16	DCD	V.24 Date Carrier Detect (VIPA)
17	K1S	TTL Baudrate coding
18	S4	(reserved)
19	MODEM	TTL Select TTY-V.24 (VIPA)
20	+20R	TTY Receive current
21	-20R	TTY Current
22	+20T	TTY Send current
23	-20T	TTY Current
24	(Screen)	
25	(Screen)	

Baudrate marking

0 corresponds to a connection with GND
(Pin 2) 1 is open (pulled up)

K3S	K2S	K1S	Baud	Comment
1	1	1	.	No connector or wrong connector
0	1	1	110	
1	0	1	600	
0	0	1	2400	V.24 Modem
1	1	0	1200	V.24 Modem
0	1	0	4800	
1	0	0	300	TTY PT88, V.24 Modem
0	0	0	9600	TTY PC, V.24 Modem

Appendix

Questions and Answers.

Q1

I have problems with indexing the Symbol file, did I forget something?

A1

You should check if the structure of the Symbol file conforms to the MC5 rules for this type of file. When transferring a Symbol file from CP/M disk to MS-DOS MC5 will automatically take care of the correct structure. A Symbol file generated with the Siemens package running under MS-DOS has to be translated to an MC5 formatted Symbol file before adopting it in the Preset. (Please refer to chapter 11.3).

Q2

My Symbol file has spaces in the Symbolic names that are not accepted by MC5.

A2

This is correct. Symbol files with spaces in the Symbolics will not be accepted by MC5, because two or more spaces behind a Symbol indicate to MC5 the start of the Symbol Description area. If your Symbol file contains Symbols with spaces as part of the Symbolic name, you have to remove these spaces or replace them with a valid character. It is possible to perform this replacement automatically with the SYMADAP.EXE program. (Please refer to chapter 22.2).

Q3

I am not able to read a PG675 diskette, what is there to consider?

A3

To be able to read PG675 diskettes your diskcontroller has to be able to read diskettes at a rate of 125kBit/sec. You also need a 360kByte double density disk drive. (Please refer to chapter 18 for suggestions).

Q4

I selected in the Printer Preset 'Compressed print (132 char/line)'. Yet the printout is in 'Normal print'.

A4

Check if your printer can be switched to compressed mode by the software. If so, enter the appropriate control characters at the 'Printer initialisation' field in the Printer Preset (see chapter 6.2.5).

Many matrixprinters support the Epson command set, many laser printers support the HP LaserJet Series II command set. For these printers the next table may be helpful:

	Epson	HP Laserjet II
IBM char.set		27 40 49 48 85
10 cpi	18	27 38 107 48 83
12 cpi	27 77	27 38 107 52 83
17/16.66 cpi	15	27 38 107 50 83
6 lines/inch	27 50	27 38 108 54 68
8 lines/inch	27 48	27 38 108 56 68

Q5

How do I print a listing of a complete Block in CSF or LAD?

A5

To make a printout of a complete Block in CSF or LAD you select the Block from the menu Print of the Info\Doc menu (selecting F7\F3\F1 from the Main menu). You also make sure that the Preset for the 'Representation' in the Editor Preset (Ctrl+F3\F5 from any menu) is set to your choice, CSF or LAD.

Q6

When do I choose to use XMS memory?

A6

You choose to use XMS memory when conventional memory is not sufficient to run your application. This may be when you want to edit very large Blocks, Blocks with extend comments and documentation or a large Symbol file or when you want to index a large Symbol file. To use XMS memory see chapter 2.6.

Q7

I did install HIMEM.SYS in my CONFIG.SYS file and yet I don't have XMS memory available. My computer has enough memory installed.

A7

You may need to look at your CONFIG.SYS or AUTOEXEC.BAT files to check if you loaded any drivers that take up all the extended memory.

Q8

I am not able to save the Blocks / files I created. What is going on?

A8

When you are using the Serial or Offline version of MC5, it is most likely that you forgot to connect the dongle on the parallel port (the printer port) of your computer.

When you are using the Full version of MC5 and you just installed an update, you may need to Patch MC5 to another I/O address (see chapter 2.1 for more details).

Q9

How do I save the Preset/configuration file with my project?

A9

By starting MC5 from your project directory.

Q10

I have problems with transferring 'S5D'-files to or from CP/M diskettes.

A10

MC5 supports PG685 and PG635 or compatible CP/M formats. The CP/M program DISK.COM also allows other formats being created. If you are sure that you are using a disk of the proper format, you may need to configure the Preset Drives (Ctrl+F3\F3 from any menu).

Q11

When I try to transfer Blocks to EPROM I can't select the EPROM module type.

A11

MC5 can't find the file MODULE.BIB. To solve this you need to tell MS-DOS where to look for the file by APPENDING the MC5 system directory in your AUTOEXEC.BAT.

Example: APPEND=C:\MC5

Q12

I encountered problems when transferring Blocks from the PLC to the computer's hard disk.

A12

You may need to look at your CONFIG.SYS or AUTOEXEC.BAT files to check if you installed a diskcache such as SMARTDRV.SYS/SMARTDRV.EXE or any other diskcache that also caches writing to disk. If so, you must disable the writecache. By default, the write behind cache of SMARTDRV is enabled. To switch off this option you need to specify to SMARTDRV the disks that should not have a write behind cache.

Example:

To disable the write behind cache for drive 'C' you enter in your CONFIG.SYS:

DEVICE=SMARTDRV.SYS C

For more information please refer to your documentation.

Q13

I am using the Full version of MC5, the one with the card. When I start MC5 it often does not recognize the card (although the address is set properly), or many communication errors occur. I am using a computer with EISA slots (e.g. a COMPAQ Portable 486).

A13

You need to turndown the speed of the communicationbus. (Unfortunately the PLC does not run as fast as the computer.) With the Compaq Portable 486 you reboot the system. The moment you see the cursor in the topright corner of the screen, you do the following:

- 1) Press F10 and ENTER at the Compaq Logo.
- 2) At the 'Welcome'-screen you press CTRL+A, you will enter the 'Advanced Configuration' utilities.
- 3) Press ENTER.
- 4) In the Main Menu you select "Configure Computer" and press ENTER.
- 5) Select "View or Edit details"
- 6) Scroll down to 'Advanced Features' (2x PgDn)
- 7) Set 'ISA Cycle Wait Control' to 540 ns.
- 8) By pressing 2x F10 you accept the settings.
- 9) ENTER at Step®5 (from Siemens) will save your settings and then exit.
- 10) Finally you select 'Save the configuration and re-boot'.

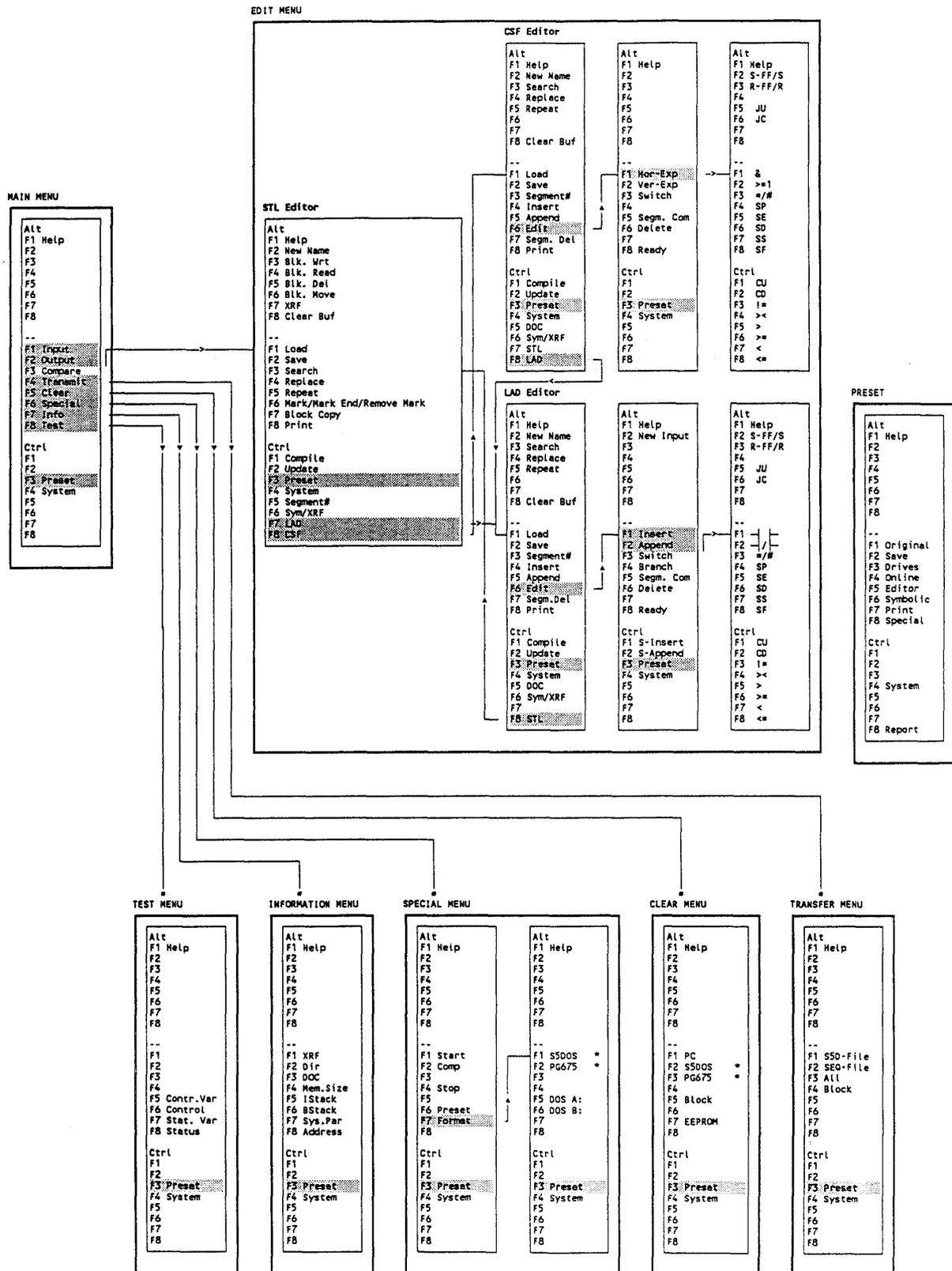
Q14

How do I..... ?

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You may find the answer to your question in this manual. If you encounter topics that are not properly described, please let us know and we will build your suggestion into our manual. Customer comments and suggestions are highly appreciated at MC5.

Menu Structure



STL = Statement List
 CSF = Control System Flowchart
 LAD = Ladder Diagram

PC = Programmable Controller
 * Availability depends on the Preset 'Drives'