



HEIDENHAIN



HEIDENHAIN Clone 1069766-01

User's Manual

Version 5

English (en)
12/2020

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1 Introduction

1.1 Meaning of the symbols used in this manual

Safety precautions

Comply with all safety precautions indicated in this User's Manual and in your machine tool builder's documentation!

The safety precautions have the following structure:

- **Signal word**
- **Type of hazard**
- **Consequence of non-compliance**
- **Instructions for avoidance of hazards**

NOTICE
<p>Overcurrent</p> <p>Damage to the product</p> <p>▶ Use original fuses!</p>

In this User's Manual, you will find the following informational notes:

NOTICE
<p>Notice indicates danger to material or data. If you do not follow the avoidance instructions, the hazard could result in property damage.</p>

Informational notes

Observe the informational notes provided in this User's Manual to ensure reliable and efficient operation of your HEIDENHAIN product.

In this manual, you will find the following informational notes:

	<p>The information symbol indicates a tip.</p> <p>A tip provides additional or supplementary information.</p>
---	--

Cross references

Use the cross references in the documentation for subject-related and comprehensive additional information.

In this manual, you will find the following cross references:

	<p>The book symbol represents a cross reference to external documentation, e.g. the documentation of your machine tool builder or other supplier.</p>
---	--

	<p>The globe symbol represents a cross reference to an Internet site.</p>
---	---

Cross references within continuous text are indicated as **Further information**.

Cross references within tables contain the page numbers only.

1.2 About HEIDENHAIN Clone

With **HEIDENHAIN Clone** you can create a copy of the data medium of your HEIDENHAIN control. Data media are:

- HDR (**H**ard **D**isk **R**emovable)
- CFR (**C**ompact **F**lash **R**emovable)
- SSDR (**S**olid **S**tate **D**isk **R**emovable)

These data media are used in the following HEIDENHAIN controls:

- MC 3xx
- MC 420
- MC 422 B
- MC 422
- MC 422 D
- MC 6xxx
- MC 7xxx
- MC 8xxx

HEIDENHAIN Clone is very easy to use. After setting the boot options in the BIOS, you can boot directly from the USB hard disk. You are then guided step by step through a dialog-based menu.



As of MC 422 C and all newer controls it is possible to boot directly from the supplied USB hard disk on the control. For the MC 420 and MC 422 B you require a notebook and the USB-HDR adapter ID 529306-01.

By backing up all your data, you can significantly reduce machine downtime in the event of a failure of the data medium. Furthermore, you always have an up-to-date data backup available directly at the machine.

HEIDENHAIN Clone not only backs up the system files for starting a control, but also all user and manufacturer data!

HEIDENHAIN Clone is a product of the HEIDENHAIN Service in Traunreut/ Germany and is based on the open source Clonezilla project.

NOTICE

Secure Boot

Damage to file system and loss of data

HEIDENHAIN CLONE does not support the UEFI specification Secure Boot.



The Clonezilla source code and further information can be found at: www.clonezilla.org

1.3 Items supplied

HEIDENHAIN Clone can be ordered from HEIDENHAIN with the ID 1069766-01. The data medium is a 2.5" USB drive with 1 TB memory size.

For the MC 420 and MC 422 B you also require the USB-HDR adapter ID 529306-01. This adapter must be ordered separately. Alternatively, you can purchase a SATA/PATA/IDE-to-USB adapter on the free market and use this adapter.

1.4 About this manual

The chapter **Quickstart** describes the steps for backup and restore in short, thus guiding you to the desired result very quickly.

In the chapter **Step-by-step** all working steps are described in detail.

You can find these instructions as PDF file on the backup partition of **HEIDENHAIN Clone**.

2 Safety precautions

2.1 Overview

HEIDENHAIN Clone



PC skills are required to use the software.

NOTICE

Loss of data!

If you use memory media with different capacities when restoring a data backup with **HEIDENHAIN Clone**, you may lose data.

- ▶ Use memory media with the same capacity



HEIDENHAIN does not assume liability for the completeness of the data backup and for the loss of data!

BIOS of the HEIDENHAIN controls



Various BIOS versions are used in HEIDENHAIN controls. Note that the screen contents shown in the manual may differ from your actual screen display.
If you have any questions, please contact HEIDENHAIN.

BIOS settings of HEIDENHAIN controls

NOTICE

Loss of data!

Wrong settings in the BIOS can result in a malfunction of the operating system and a loss of data.

- ▶ Ensure that the BIOS settings are correct

Removing or inserting the memory media

NOTICE

Loss of data!

If you remove or install memory media while the machine is running, you may lose data.

- ▶ Switch off the machine
- ▶ Remove or install the memory medium



For information, refer to the service manual.

Export license required



Note that export licensing is also required for the data backup (clone) of a memory media with software that is subject to export license.

Memory media for HEIDENHAIN controls



Only use original HEIDENHAIN parts (HDR, CFR, SSSDR).
In case non-HEIDENHAIN products are used, proper operation cannot be guaranteed.

Liability



HEIDENHAIN does not accept any responsibility for indirect or direct damage caused to persons or property through incorrect use or operation of the machine!

ESD protection

ESD = Electrostatic discharge

NOTICE

Electrostatic discharge (ESD)!

Improper handling can lead to damage to components or assemblies by ESD.

- ▶ Observe the ESD protective measures when exchanging HDR, SSSDR and CFR
- ▶ Never touch connector pins without ensuring proper grounding
- ▶ When handling components, ensure that the working area (e.g. tool, workbench, packaging) and the person are properly grounded
- ▶ Inspect the ESD protection system regularly

3 Quickstart

3.1 MC 420, MC 422B



For MC 420 and MC 422B you require a separate PC and the USB-HDR adapter ID 529306-01. As an alternative, a universal hard-disk adapter can be used.

Remove all unnecessary devices that are connected to the PC via USB. Only operate the HEIDENHAIN Clone hard disk, an external keyboard and the hard disk of the control via the USB interface of your PC.

3.1.1 Backing up data

Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Switch off the main switch of the machine ▶ Take precautions against restart of the machine ▶ Ensure that the equipment is free of potential 	
2	<ul style="list-style-type: none"> ▶ Remove the HDR from the control (MC) 	See step-by-step instructions or Service Manual
3	<ul style="list-style-type: none"> ▶ Insert the HDR into the USB-HDR adapter (ID 529306-01) 	
4	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Call the boot menu during start-up ▶ Boot from the HEIDENHAIN Clone USB hard disk 	<p>The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ...</p> See User's Manual of your PC
5	<p>When the HEIDENHAIN Clone screen appears</p> <ul style="list-style-type: none"> ▶ Connect the hard disk of the control 	
6	<ul style="list-style-type: none"> ▶ In the main menu, select <HEIDENHAIN-CLONE BACKUP> 	
7	<ul style="list-style-type: none"> ▶ Enter a title for the backup 	
8	<ul style="list-style-type: none"> ▶ Select the hard disk of the control ▶ Follow the instructions on the screen 	<p>"sda" is usually the internal hard disk of your PC. Therefore, do not select "sda"! The hard disk of the control is e.g. "sdb 40GB" (depending on the number of connected drives).</p> See step-by-step instructions

3.1.2 Restoring data

Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Call the boot menu during start-up ▶ Boot from the HEIDENHAIN Clone USB hard disk 	<p>The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ...</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  See User's Manual of your PC </div>
2	<p>When the HEIDENHAIN Clone screen appears</p> <ul style="list-style-type: none"> ▶ Connect the hard disk of the control 	<p>The hard disk must be in the USB-HDR adapter ID 529306-01</p>
3	<ul style="list-style-type: none"> ▶ In the main menu, select <HEIDENHAIN-CLONE RESTORE> 	
4	<ul style="list-style-type: none"> ▶ Select the created backup 	
5	<ul style="list-style-type: none"> ▶ Select the hard disk of the control ▶ Follow the instructions on the screen 	<p>"sda" is usually the internal hard disk of your PC. Therefore, do not select "sda"! The hard disk of the control is e.g. "sdb 40GB" (depending on the number of connected drives).</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  See step-by-step instructions </div>

NOTICE

Loss of data

If you select the wrong drive here, the hard disk of your PC may be overwritten!

- ▶ Select the correct hard disk

3.2 MC 3xx, MC 422C, MC 422D, MC 6xxx, MC 7xxx, MC 8xxx

 All inputs should always be made using an external USB keyboard.

 Remove all unnecessary devices that are connected to the control via USB. Only operate the HEIDENHAIN Clone hard disk and an external keyboard directly on the MC via the USB interfaces. Do not use the USB connection on the keyboard unit.

3.2.1 Selecting the BIOS and UEFI settings depending on the control

Select the BIOS settings for	Select the UEFI settings for
MC 422C	MC 128
MC 422D	MC 3xx
MC 61xx	MC 64xx
MC 62xx	MC 65xx
MC 63xx	MC 66xx
MC 71xx	MC 68xx
MC 72xx	MC 74xx
MC 73xx	MC 75xx
	MC 76xx
	MC 8410
	MC 85xx

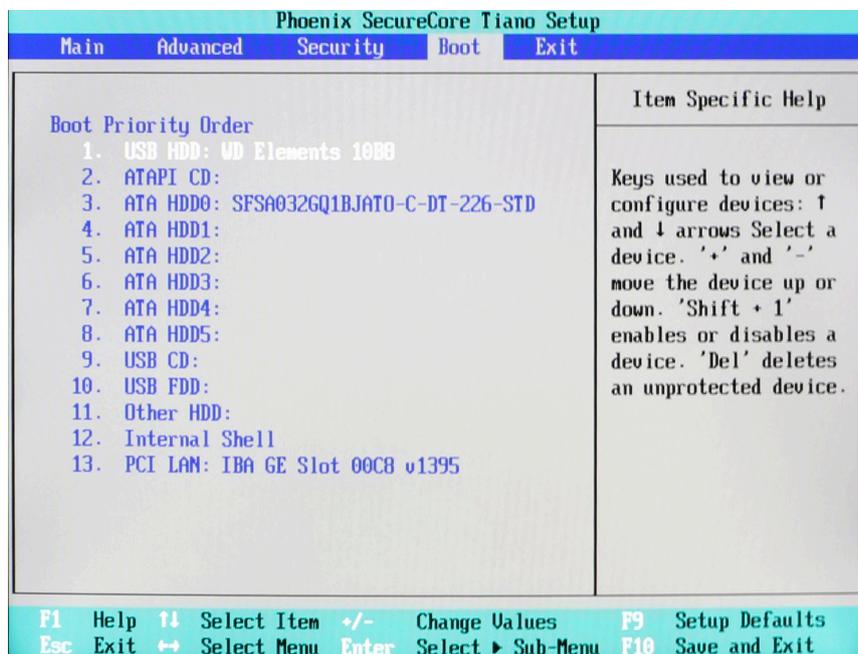
The settings described can apply to other MCs.

3.2.2 Selecting the BIOS settings

Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Press the DEL key during booting > BIOS starts 	
2	<ul style="list-style-type: none"> ▶ Select the Integrated Peripherals menu item ▶ Select the USB Device Setting submenu ▶ Set the USB Operation Mode entry to Full/Low Speed 	Only for MC 6xxx, MC 7xxx , if the entry is available
3	<ul style="list-style-type: none"> ▶ Save the settings ▶ Restart the control ▶ Call the BIOS again 	Only for MC 6xxx, MC 7xxx
4	<ul style="list-style-type: none"> ▶ Select the Advanced BIOS Features menu item 	
5	<ul style="list-style-type: none"> ▶ Move the USB-HDD0 in the Hard Disk Boot Priority menu item to the top of the list 	Only if available
6	<ul style="list-style-type: none"> ▶ Set the HEIDENHAIN Clone USB hard disk as the First Boot Device 	Depending on the BIOS version, the menu item must be set to USB-FDD, USB-HDD, Removable , etc.
7	<ul style="list-style-type: none"> ▶ Set the Boot Other Device menu item to Enabled 	
8	<ul style="list-style-type: none"> ▶ Call the Standard CMOS Features menu ▶ Set the IDE Primary Master menu item to None 	Only for MC 422C single processor
9	<ul style="list-style-type: none"> ▶ Save the settings ▶ Restart the control 	

3.2.3 Selecting the UEFI settings

Step	Action	Info
1	▶ Press the EMERGENCY STOP button on the machine	
2	▶ Connect the HEIDENHAIN Clone USB hard disk to the USB connector on the MC	
3	<ul style="list-style-type: none"> ▶ Switch on the control ▶ Press the F2 key repeatedly during startup > UEFI starts If the UEFI screen does not appear: <ul style="list-style-type: none"> ▶ Shut down the control ▶ Repeat the procedure 	
4	<ul style="list-style-type: none"> ▶ Select the Boot menu with the arrow keys ▶ USB HDD: Select the WD elements with the arrow keys ▶ Use the Shift key and + key to move the highlighted hard disk to the top of the list 	



5	<ul style="list-style-type: none"> ▶ Press the arrow key to select Exit ▶ Select Exit Saving Changes ▶ Press the Enter key ▶ Select Yes ▶ Press the Enter key again > The control restarts > HEIDENHAIN Clone is started 	With the German keyboard layout, "Y" is on "Z".
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3.2.4 Backing up data

Step	Action	Info
1	▶ In the main menu, select <HEIDENHAIN-CLONE BACKUP>	
2	▶ Enter a title for the backup	
3	▶ Select the hard disk of the control ▶ Follow the instructions on the screen	
4	▶ When the control is started again, call the BIOS ▶ Activate the Load Optimized Defaults menu item	

3.2.5 Restoring data

Step	Action	Info
1	▶ In the main menu, select <HEIDENHAIN-CLONE RESTORE>	
2	▶ Select the created backup	
3	▶ Select the hard disk of the control ▶ Follow the instructions on the screen	
4	▶ When the control is started again, call the BIOS ▶ Activate the Load Optimized Defaults menu item	

4 Step-by-step instructions

4.1 MC 420, MC 422B



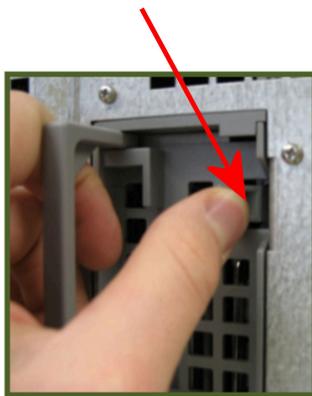
For MC 420 and MC 422B you require a separate PC and the USB-HDR adapter ID 529306-01. As an alternative, a universal hard-disk adapter can be used.

Remove all unnecessary devices that are connected to the PC via USB. Only operate the HEIDENHAIN Clone hard disk, an external keyboard and the hard disk of the control via the USB interface of your PC.

4.1.1 Backing up data

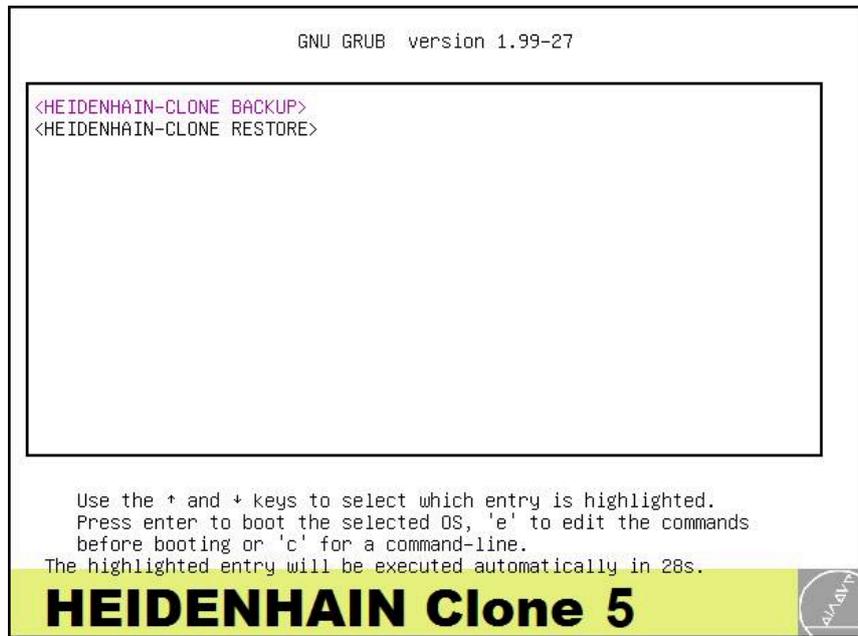
Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Switch off the main switch of the machine ▶ Take precautions against restart of the machine ▶ Ensure that the equipment is free of potential 	
2	<ul style="list-style-type: none"> ▶ Remove the HDR from the control (MC) 	 See Service Manual

Unlocking

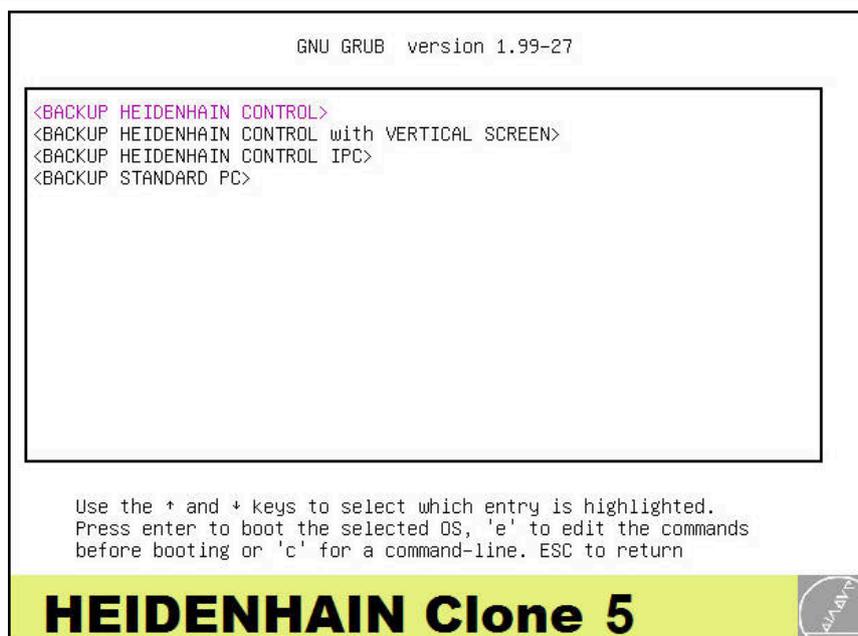


3	<ul style="list-style-type: none"> ▶ Insert the HDR into the USB-HDR adapter (ID 529306-01) 	Do not connect the adapter to the PC yet!
4	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Switch on the PC 	
5	<ul style="list-style-type: none"> ▶ When the PC is switched on, repeatedly press the key used for calling the boot menu > The boot menu is displayed <p>If the boot menu does not appear:</p> <ul style="list-style-type: none"> ▶ Restart the PC ▶ Repeat the procedure 	The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ... <div style="border: 1px solid black; padding: 5px;">  See User's Manual of your PC </div>
6	<ul style="list-style-type: none"> ▶ Select the HEIDENHAIN Clone USB hard disk in the boot menu ▶ Press the Enter key 	Depending on the PC, the HEIDENHAIN Clone USB hard disk is designated USB Device, USB Storage Device, Removable, or similar, depending on the PC

Step	Action	Info
7	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE BACKUP> from the main menu ▶ Press the Enter key 	If no key is pressed within 30 seconds, the highlighted line will be executed automatically.

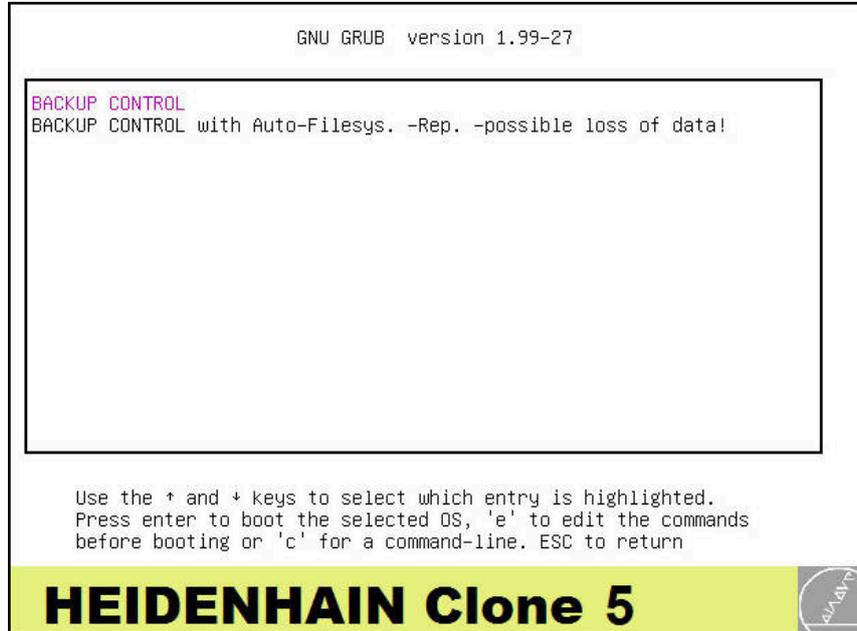


8	<ul style="list-style-type: none"> ▶ Select <BACKUP HEIDENHAIN CONTROL> from the menu 	
---	---	--

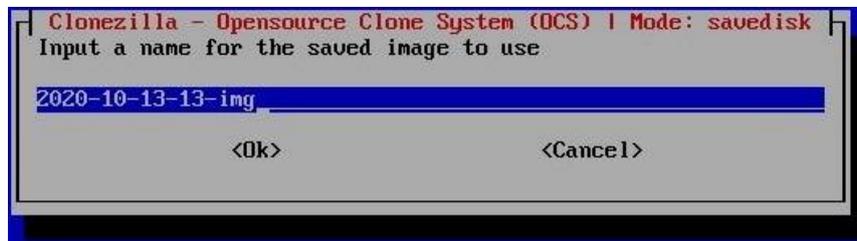


Step	Action	Info
------	--------	------

- | | | |
|---|--|--|
| 9 | <ul style="list-style-type: none"> ▶ Select BACKUP CONTROL from the menu | |
|---|--|--|



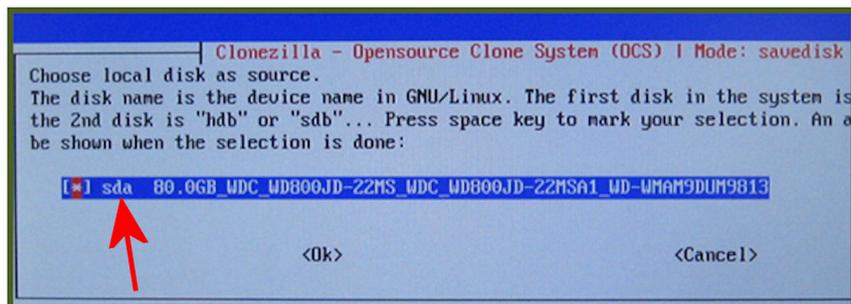
- | | | |
|----|--|--|
| 10 | <ul style="list-style-type: none"> ▶ Press the Enter key to skip the next step
Input a name | |
|----|--|--|



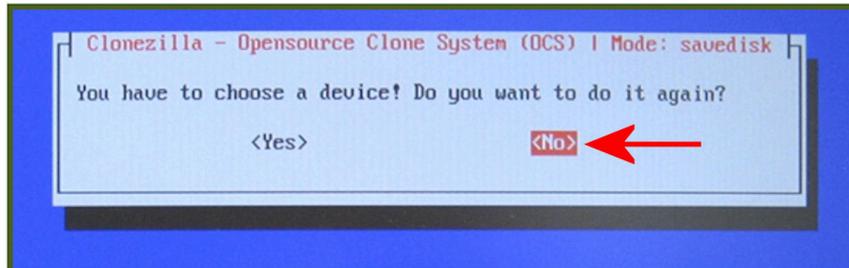
- | | | |
|----|--|--|
| 11 | <ul style="list-style-type: none"> ▶ Note down all options available in the next menu | |
|----|--|--|

In the following example, **sda** is to be noted down.

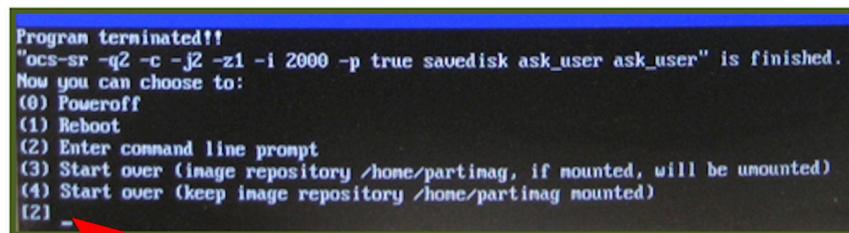
- ▶ Press the **ESC** key



Step	Action	Info
12	<ul style="list-style-type: none"> ▶ Select <No> ▶ Press the Enter key 	Select with the "Tab" key, confirm with "Enter"

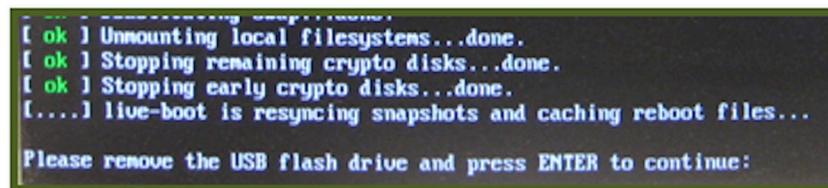


13	<ul style="list-style-type: none"> ▶ Enter "0" ▶ Press the Enter key to switch off the PC 	
----	--	--



Enter "0".

14	<p>When the text in the figure below is displayed</p> <ul style="list-style-type: none"> ▶ Remove the HEIDENHAIN Clone USB hard disk ▶ Press the Enter key ▶ The PC is switched off 	
----	--	--

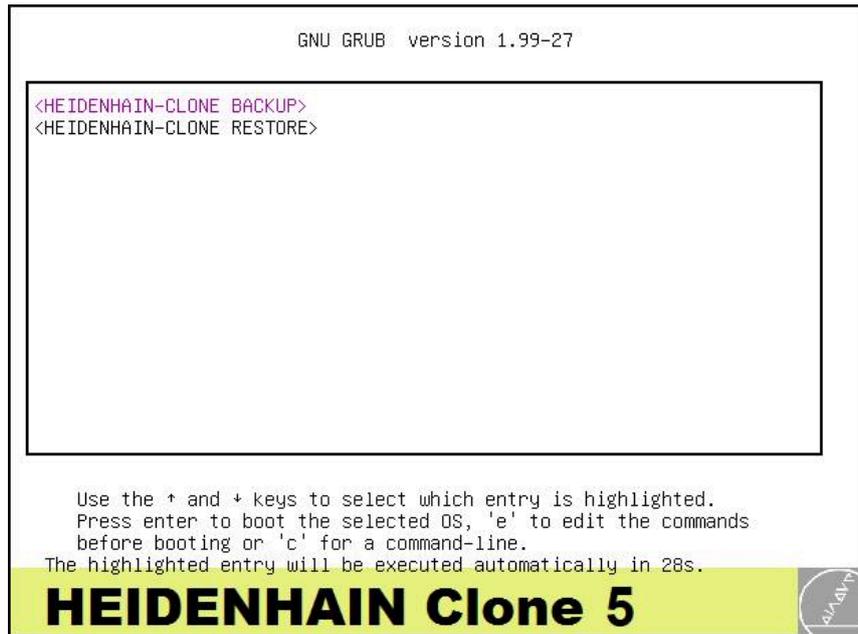


15	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Switch on the PC 	
----	---	--

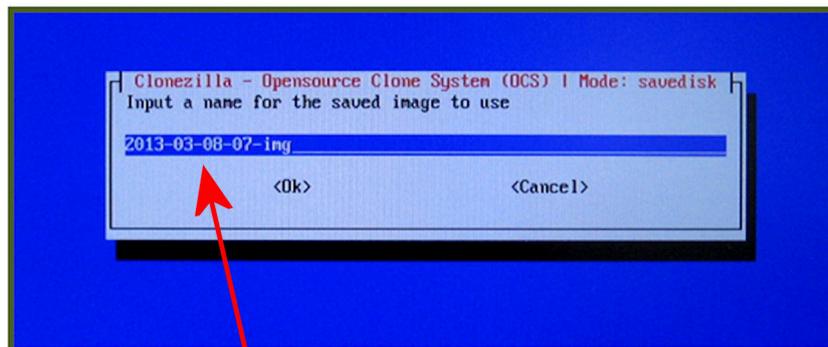
16	<ul style="list-style-type: none"> ▶ When the PC is switched on, repeatedly press the key used for calling the boot menu ▶ The boot menu is displayed ▶ If the boot menu does not appear: <ul style="list-style-type: none"> ▶ Restart the PC ▶ Repeat the procedure 	<p>The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ...</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;"> See User's Manual of your PC </div>
----	--	---

17	<ul style="list-style-type: none"> ▶ Select the HEIDENHAIN Clone USB hard disk from the boot menu ▶ Press the Enter key 	The HEIDENHAIN Clone USB hard disk is designated USB Device, USB Storage Device, Removable , or similar.
----	---	--

Step	Action	Info
18	<p>When the main menu of the program is displayed:</p> <ul style="list-style-type: none"> ▶ Connect the USB-HDR adapter ID 529306-01 (with the hard disk of the control) to the power supply system and the PC 	<p>The hard disk must be inserted in the adapter, before the adapter is connected.</p>



19	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE BACKUP> from the main menu ▶ Press the Enter key ▶ Repeat steps 8 and 9 	
20	<ul style="list-style-type: none"> ▶ Enter a title for the backup ▶ Press the Enter key 	<p>If no key is pressed within 30 seconds, the highlighted line will be executed automatically.</p>



Delete the default input and replace it by your own title.

Step	Action	Info
21	<ul style="list-style-type: none"> ▶ Use the arrow keys to select the hard disk of the control as the source drive ▶ Highlight it by pressing the space bar ▶ Press the Enter key <p>The hard disk of your control is the drive that is now additionally displayed in the list (see step 11).</p>	

```
Choose local disk as source.
The disk name is the device name in GNU/Linux. The first disk in the system is
the 2nd disk is "hdb" or "sdb"... Press space key to mark your selection. An as
be shown when the selection is done:

[ ] sda 80.0GB_WDC_WD800JD-22MS_WDC_WD800JD-22MSA1_WD-WMAM9DUM9813
[*] sdb 40.0GB_USB20_DISK_DRIVE_TUSB6250_USB20_DISK_DRIVE_ACD6CE632004-0:0

                                <Ok>                                <Cancel>
```

In this example, sdb is the drive to be found. sda could already be selected in step 9

22	<ul style="list-style-type: none"> ▶ Enter "Y" ▶ Press the Enter key ▶ The cloning process starts 	With the German keyboard layout, "Y" is on "Z".
----	---	---

```
sdb6 (25G_ufat_TNC(In_USB20_DISK_DRIVE)_TUSB6250_USB20_
*****
-> "/home/partinag/2013-03-08-09-ing".
Are you sure you want to continue? ? (y/n) y
```

23	<ul style="list-style-type: none"> ▶ Wait until the cloning process has been completed ▶ Enter "0" ▶ Press the Enter key to switch off the PC 	
----	---	--

```
Program terminated!!
"ocs-sr -q2 -c -j2 -z1 -i 2000 -p true savedisk ask_user ask_user" is finished.
Now you can choose to:
(0) Poweroff
(1) Reboot
(2) Enter command line prompt
(3) Start over (image repository /home/partinag, if mounted, will be unmounted)
(4) Start over (keep image repository /home/partinag mounted)
[2] _
```

Enter "0".

24	<p>When the text in the figure below is displayed</p> <ul style="list-style-type: none"> ▶ Remove the HEIDENHAIN Clone USB hard disk ▶ Press the Enter key ▶ System halted is displayed ▶ Switch off the PC 	
----	--	--

Step	Action	Info
------	--------	------

```
[ ok ] Unmounting local filesystems...done.  
[ ok ] Stopping remaining crypto disks...done.  
[ ok ] Stopping early crypto disks...done.  
[....] live-boot is resyncing snapshots and caching reboot files...  
  
Please remove the USB flash drive and press ENTER to continue:
```

A clone of your control hard disk was created on the HEIDENHAIN Clone USB hard disk.

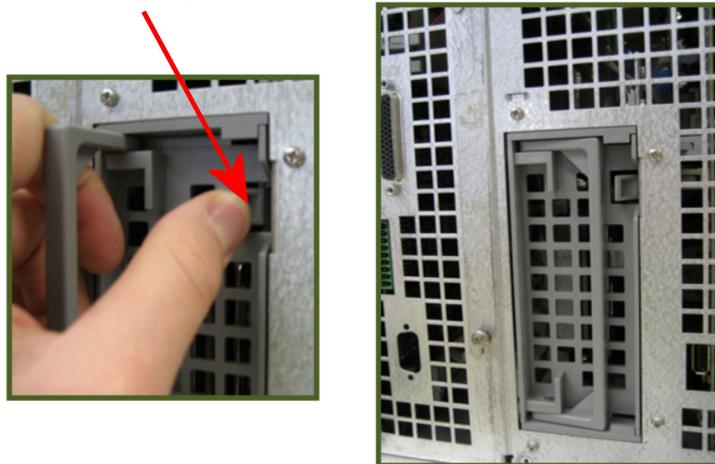
- ▶ Remove the hard disk of the control from the USD-HDR adapter ID 529306-01
- ▶ Mount the hard disk back into the control

Now you can use your control as usual.

4.1.2 Restoring data

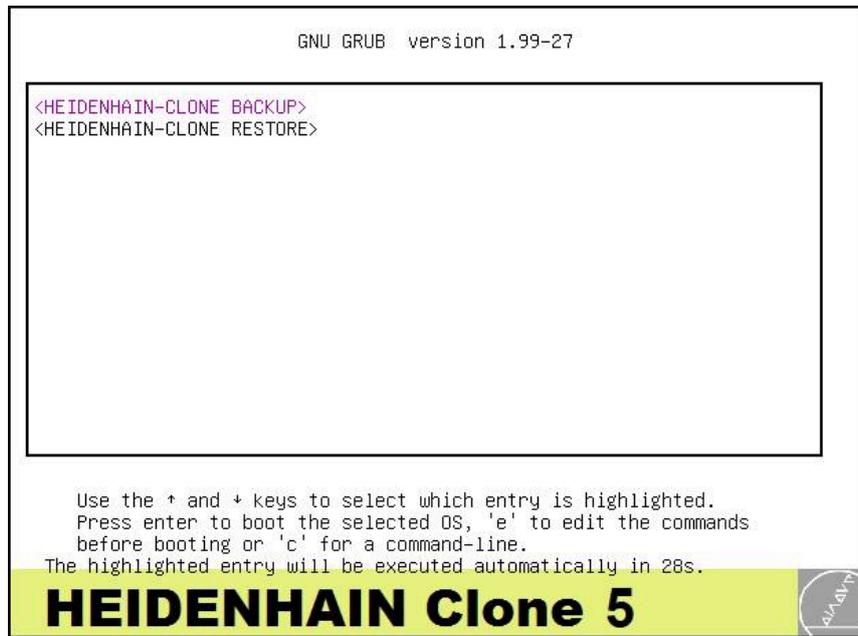
Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Switch off the main switch of the machine ▶ Take precautions against restart of the machine ▶ Ensure that the equipment is free of potential 	
2	<ul style="list-style-type: none"> ▶ Remove the HDR from the control (MC) 	 See Service Manual

Unlocking

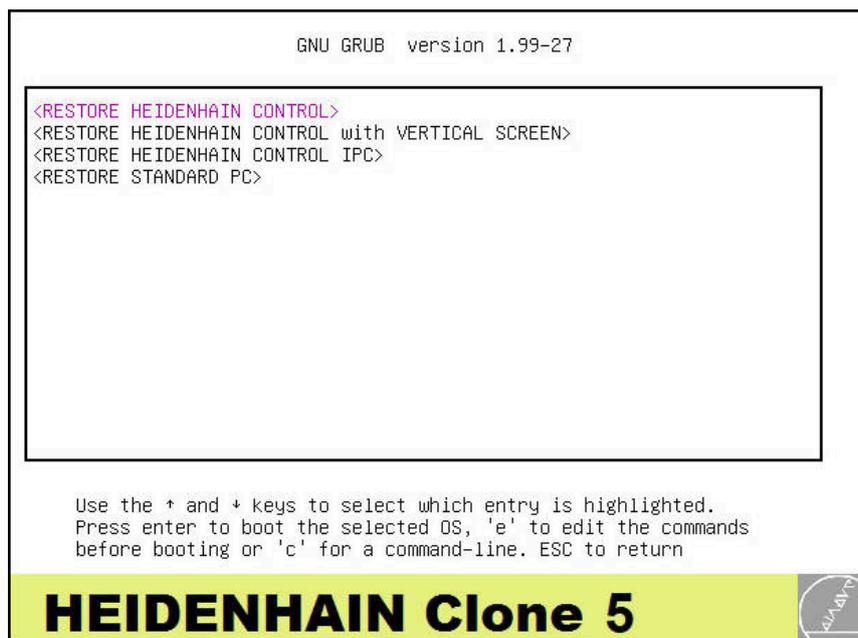


3	<ul style="list-style-type: none"> ▶ Insert the HDR into the USB-HDR adapter (ID 529306-01) 	Do not connect the adapter to the PC yet!
4	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Switch on the PC 	
5	<ul style="list-style-type: none"> ▶ When the PC is switched on, repeatedly press the key used for calling the boot menu > The boot menu is displayed <p>If the boot menu does not appear:</p> <ul style="list-style-type: none"> ▶ Restart the PC ▶ Repeat the procedure 	The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ... <div style="border: 1px solid black; padding: 5px;">  See User's Manual of your PC </div>
6	<ul style="list-style-type: none"> ▶ Select the HEIDENHAIN Clone USB hard disk from the boot menu ▶ Press the Enter key 	The HEIDENHAIN Clone USB hard disk is designated USB Device, USB Storage Device, Removable, UEFI: WD Elements, or similar, depending on the PC.

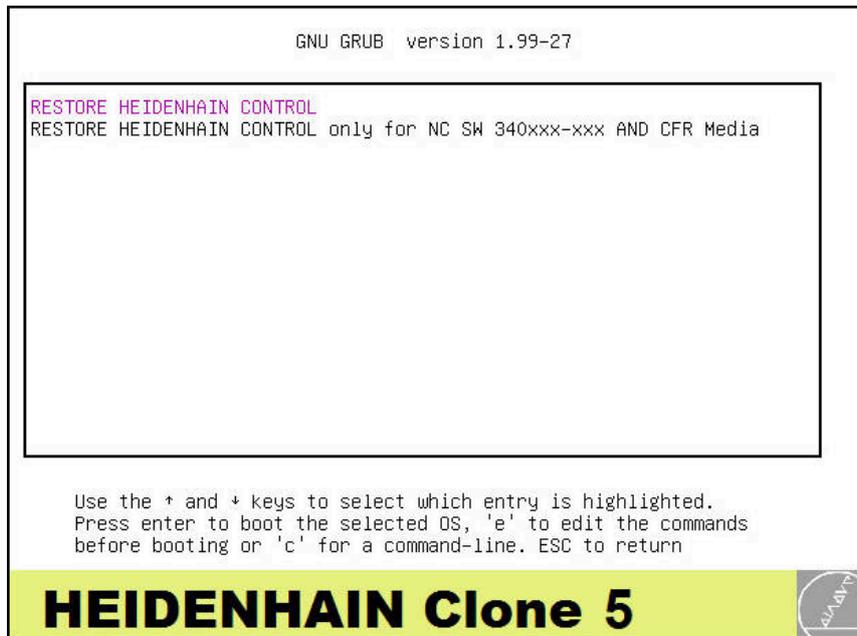
Step	Action	Info
7	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE RESTORE> from the main menu ▶ Press the Enter key 	If no key is pressed within 30 seconds, the highlighted line will be executed automatically.



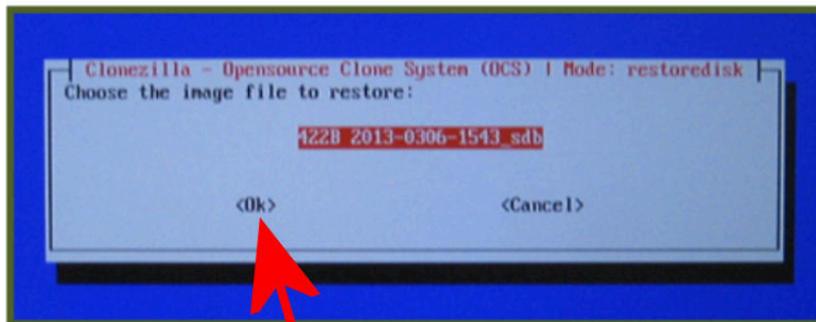
8	<ul style="list-style-type: none"> ▶ Select <RESTORE HEIDENHAIN CONTROL> from the menu ▶ Press the Enter key 	
---	--	--



Step	Action	Info
9	<ul style="list-style-type: none"> ▶ Select RESTORE HEIDENHAIN CONTROL from the menu ▶ Press the Enter key 	

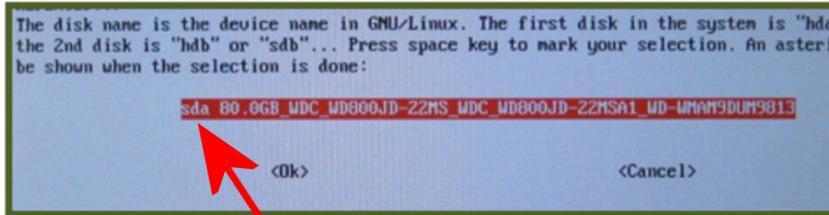


10	<ul style="list-style-type: none"> ▶ Press the Enter key to skip the next step <p>Choose the image file</p>	
----	--	--



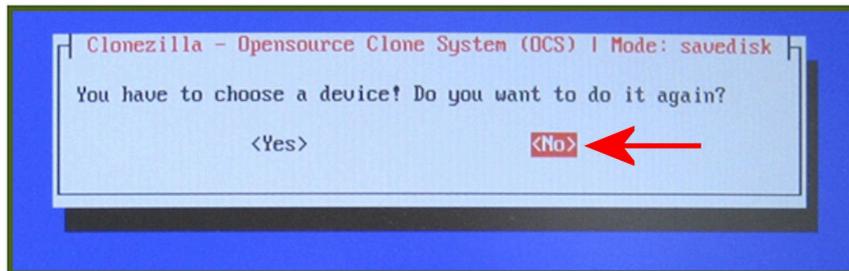
Press Enter

Step	Action	Info
11	<ul style="list-style-type: none"> ▶ Note down all options available in the next menu <p>In the following example, sda is to be noted down</p> <ul style="list-style-type: none"> ▶ Press the ESC key 	

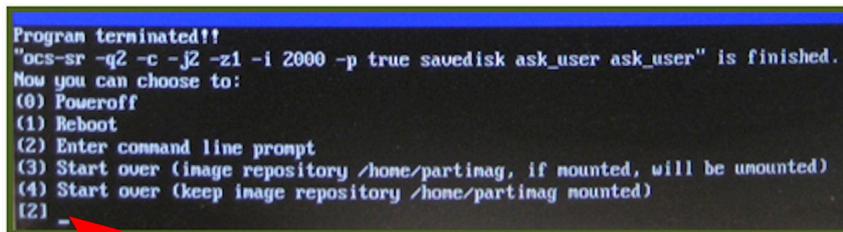


In this example, note down "sda".

12	<ul style="list-style-type: none"> ▶ Select <No> ▶ Press the Enter key 	Select with the "Tab" key, confirm with "Enter"
----	--	---

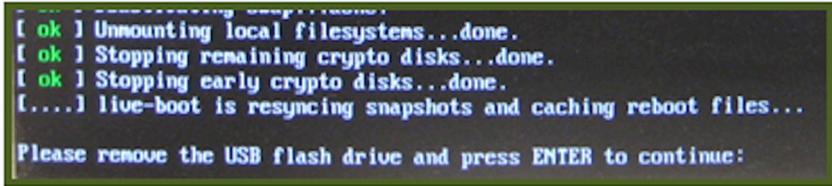


13	<ul style="list-style-type: none"> ▶ Enter "0" ▶ Press the Enter key to switch off the PC 	
----	--	--

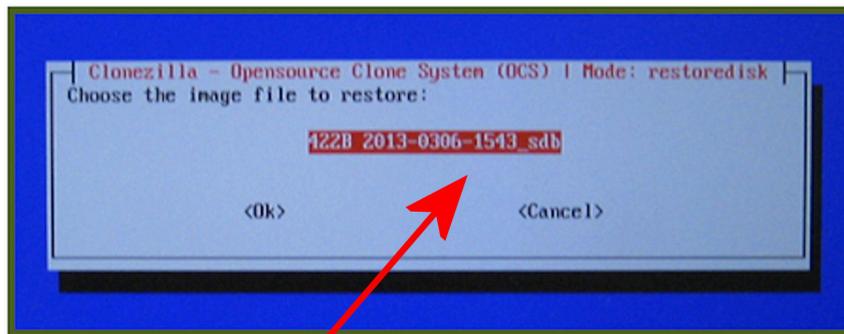


Enter "0".

14	<p>When the text in the figure below is displayed</p> <ul style="list-style-type: none"> ▶ Remove the HEIDENHAIN Clone USB hard disk ▶ Press the Enter key ▶ The PC is switched off 	
----	--	--

Step	Action	Info
		
15	<ul style="list-style-type: none"> ▶ Connect the HEIDENHAIN Clone USB hard disk to the PC ▶ Switch on the PC 	
16	<ul style="list-style-type: none"> ▶ When the PC is switched on, repeatedly press the key used for calling the boot menu > The boot menu is displayed <p>If the boot menu does not appear:</p> <ul style="list-style-type: none"> ▶ Restart the PC ▶ Repeat the procedure 	<p>The key for calling the boot menu varies depending on the PC manufacturer, e.g., F12, F8, Esc, ...</p> <div style="border: 1px solid black; padding: 5px; display: inline-block;">  See User's Manual of your PC </div>
17	<ul style="list-style-type: none"> ▶ Select the HEIDENHAIN Clone USB hard disk from the boot menu ▶ Press the Enter key 	<p>The HEIDENHAIN Clone USB hard disk is designated USB Device, USB Storage Device, Removable, UEFI: WD Elements, or similar, depending on the PC.</p>
18	<p>When the main menu of the program is displayed:</p> <ul style="list-style-type: none"> ▶ Connect the USB-HDR adapter ID 529306-01 (with the hard disk of the control) to the power supply system and the PC 	<p>The hard disk must be inserted in the adapter before the adapter is connected.</p>
<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p style="text-align: center;">GNU GRUB version 1.99-27</p> <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: 80%;"> <p><HEIDENHAIN-CLONE BACKUP> <HEIDENHAIN-CLONE RESTORE></p> </div> <p style="font-size: small; margin-top: 10px;">Use the ↑ and → keys to select which entry is highlighted. Press enter to boot the selected OS, 'e' to edit the commands before booting or 'c' for a command-line. The highlighted entry will be executed automatically in 28s.</p> <div style="background-color: #90EE90; padding: 5px; display: flex; justify-content: space-between; align-items: center;"> HEIDENHAIN Clone 5  </div> </div>		

Step	Action	Info
19	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE RESTORE> from the main menu ▶ Press the Enter key ▶ Repeat steps 8 and 9 	If no key is pressed within 30 seconds, the highlighted line will be executed automatically.
20	<ul style="list-style-type: none"> ▶ Select the requested backup (see Backup) ▶ Press the Enter key 	



Select backup and press Enter

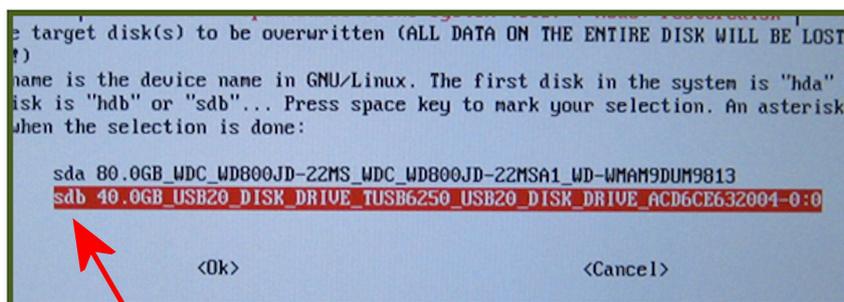
21	<ul style="list-style-type: none"> ▶ Use the arrow keys to select the hard disk of the control as the target drive ▶ Press the Enter key <p>The hard disk of your control is the drive that is now additionally displayed in the list (see step 11).</p>
----	---

NOTICE

Loss of data!

If you select the wrong drive, it is possible that the hard disk of your PC is overwritten.

- ▶ Make sure that the correct drive is selected



In this example, sdb is the target drive. sda (hard disk of your PC) could already be selected in step 9.

22	<ul style="list-style-type: none"> ▶ You are prompted twice to confirm with "Y". Then the restore procedure starts. 	With the German keyboard layout, "Y" is on "Z".
----	--	---

Step	Action	Info
23	<ul style="list-style-type: none"> ▶ Wait until the restore process has been completed ▶ Enter "0" ▶ Press the Enter key to switch off the PC 	

```

Program terminated!!
"ocs-sr -q2 -c -j2 -z1 -i 2000 -p true savedisk ask_user ask_user" is finished.
Now you can choose to:
(0) Poweroff
(1) Reboot
(2) Enter command line prompt
(3) Start over (image repository /hone/partinag, if mounted, will be unmounted)
(4) Start over (keep image repository /hone/partinag mounted)
[2] _
    
```

 Enter "0".

24	<p>When the text in the figure below is displayed</p> <ul style="list-style-type: none"> ▶ Remove the HEIDENHAIN Clone USB hard disk ▶ Press the Enter key ▶ System halted is displayed ▶ Switch off the PC 	
----	--	--

```

[ ok ] Unmounting local filesystems...done.
[ ok ] Stopping remaining crypto disks...done.
[ ok ] Stopping early crypto disks...done.
[....] live-boot is resyncing snapshots and caching reboot files...
Please remove the USB flash drive and press ENTER to continue:
    
```

Your hard disk has been restored and corresponds to the state of the backup.

- ▶ Remove the hard disk of the control from the USD-HDR adapter ID 529306-01
- ▶ Mount the hard disk back into the control

Now you can use your control as usual.

4.2 MC 3xx, MC 422C, MC 422D, MC 6xxx, MC 7xxx, MC 8xxx



All inputs should always be made using an external USB keyboard.



Remove all unnecessary devices that are connected to the control via USB. Only operate the HEIDENHAIN Clone hard disk and an external keyboard directly on the MC via the USB interfaces. Do not use the USB connection on the keyboard unit.

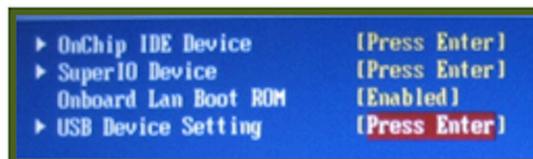
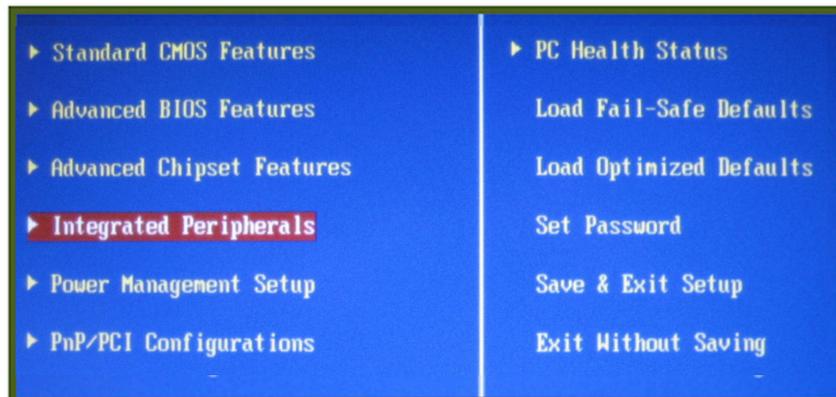
4.2.1 Selecting the BIOS and UEFI settings depending on the control

Select the BIOS settings for	Select the UEFI settings for
MC 422C	MC 128
MC 422D	MC 3xx
MC 61xx	MC 64xx
MC 62xx	MC 65xx
MC 63xx	MC 66xx
MC 71xx	MC 68xx
MC 72xx	MC 74xx
MC 73xx	MC 75xx
	MC 76xx
	MC 8410
	MC 85xx

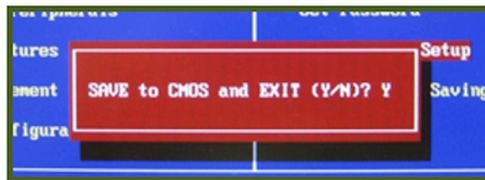
The settings described can apply to other MCs.

4.2.2 Selecting BIOS settings

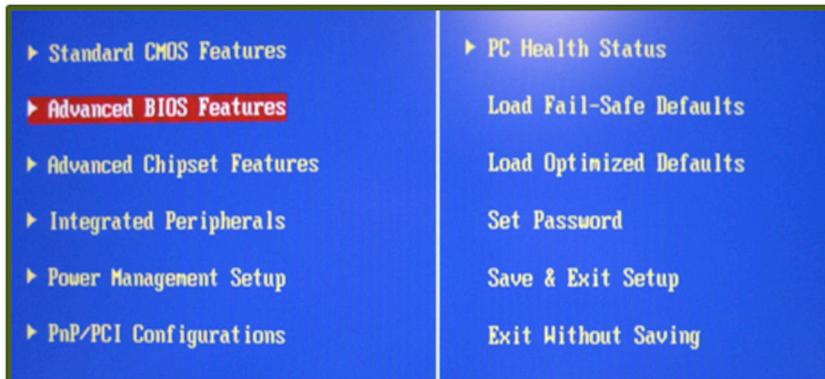
Step	Action	Info
1	▶ Press the EMERGENCY STOP key on the machine	
2	▶ Connect the HEIDENHAIN Clone USB hard disk to the USB connection of the control	
3	<ul style="list-style-type: none"> ▶ Switch on the control ▶ During start-up, repeatedly press the DEL key > BIOS starts If the BIOS screen is not displayed: <ul style="list-style-type: none"> ▶ Shut down the control ▶ Repeat the procedure 	
4	<ul style="list-style-type: none"> ▶ Select the Integrated Peripherals menu ▶ Select the USB Device Setting submenu ▶ Set the USB Operation Mode entry to Full/Low Speed 	Only for MC 6xxx, MC 7xxx , if the entry is available



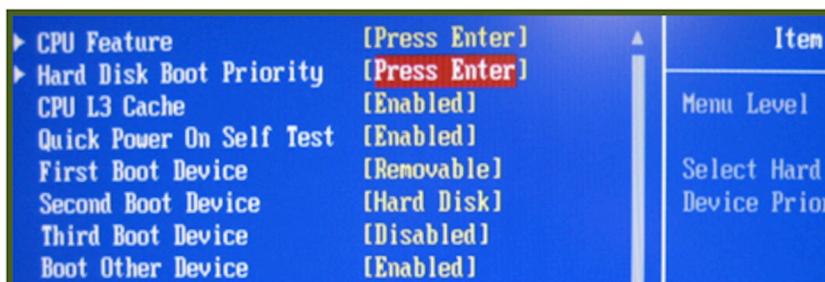
Step	Action	Info
5	<ul style="list-style-type: none"> ▶ Press the Esc key to return to the main menu ▶ Select Save & Exit Setup ▶ Press the Enter key ▶ Confirm with "Y" ▶ Press the Enter key again 	With the German keyboard layout, "Y" is on "Z".



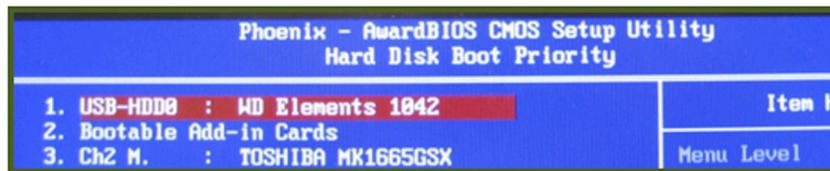
6	<ul style="list-style-type: none"> ▶ Restart the control ▶ Call the BIOS again 	
7	<ul style="list-style-type: none"> ▶ Select Advanced BIOS Features with the arrow keys ▶ Press the Enter key 	



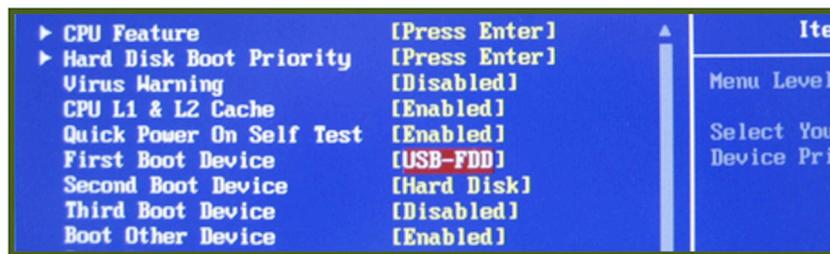
8	<ul style="list-style-type: none"> ▶ Select the Hard Disk Boot Priority menu item ▶ Press the Enter key 	Only if the menu item is available
---	---	---



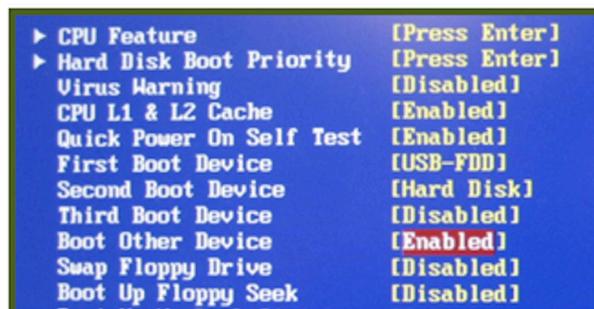
Step	Action	Info
9	<ul style="list-style-type: none"> ▶ Highlight the USB-HDD0 menu item ▶ Press the + or - key until USB-HDD0 is at the top of the list ▶ Press the ESC key to exit the menu 	Only if step 5 was carried out



10	<ul style="list-style-type: none"> ▶ Set the First Boot Device menu item to USB-FDD or USB-HDD or Removable 	The selection possibilities depend on the BIOS version.
----	--	---



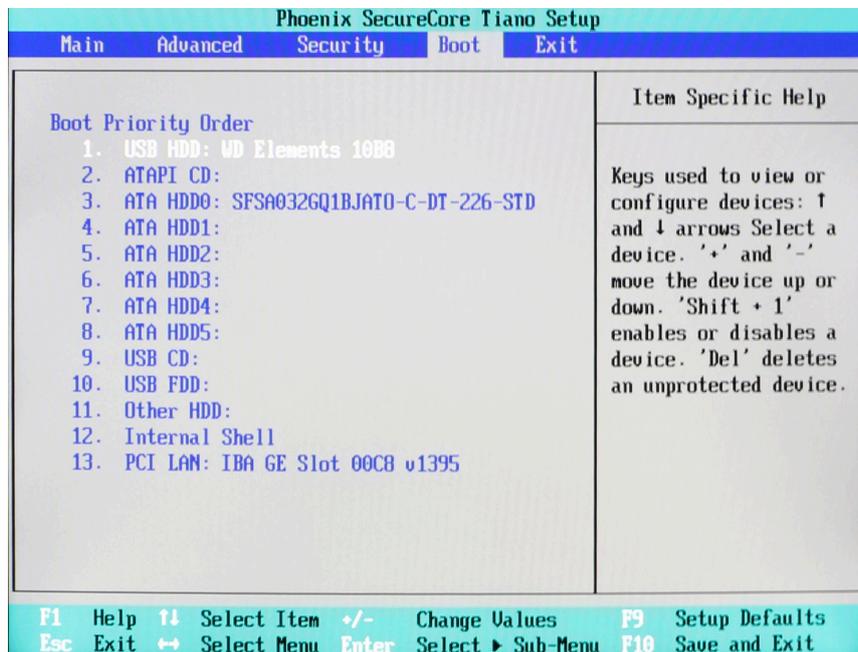
11	<ul style="list-style-type: none"> ▶ Set the Boot Other Device menu item to Enabled 	
----	--	--



12	<ul style="list-style-type: none"> ▶ Press the Esc key to return to the main menu ▶ Select the Standard CMOS Features menu item ▶ Set the IDE Primary Master menu item to None 	Only for single-processor MC 422C
----	---	--

4.2.3 Selecting the UEFI settings

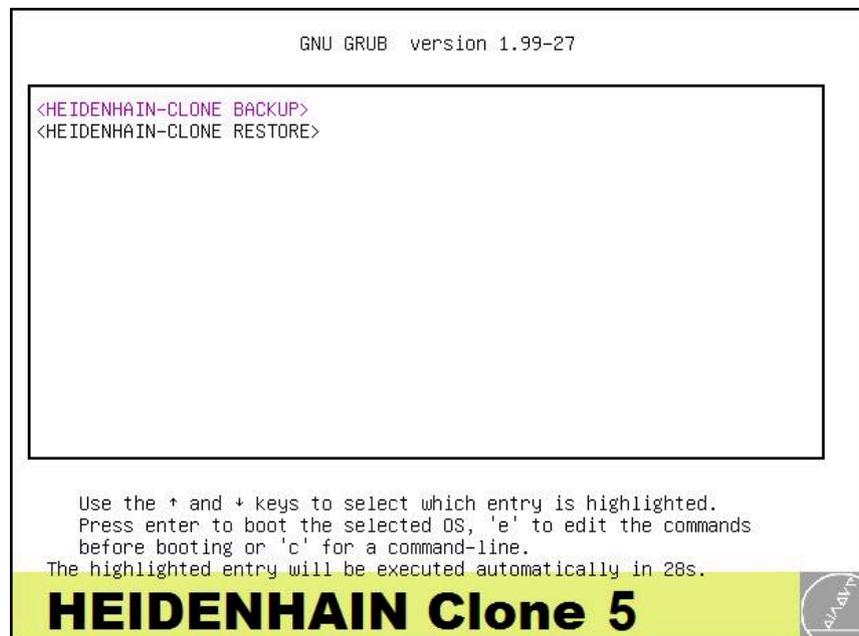
Step	Action	Info
1	▶ Press the EMERGENCY STOP button on the machine	
2	▶ Connect the HEIDENHAIN Clone USB hard disk to the USB connector on the MC	
3	▶ Switch on the control ▶ Press the F2 key repeatedly during startup > UEFI starts If the UEFI screen does not appear: ▶ Shut down the control ▶ Repeat the procedure	
4	▶ Select the Boot menu with the arrow keys ▶ USB HDD: Select the WD elements with the arrow keys ▶ Use the Shift key and + key to move the highlighted hard disk to the top of the list	



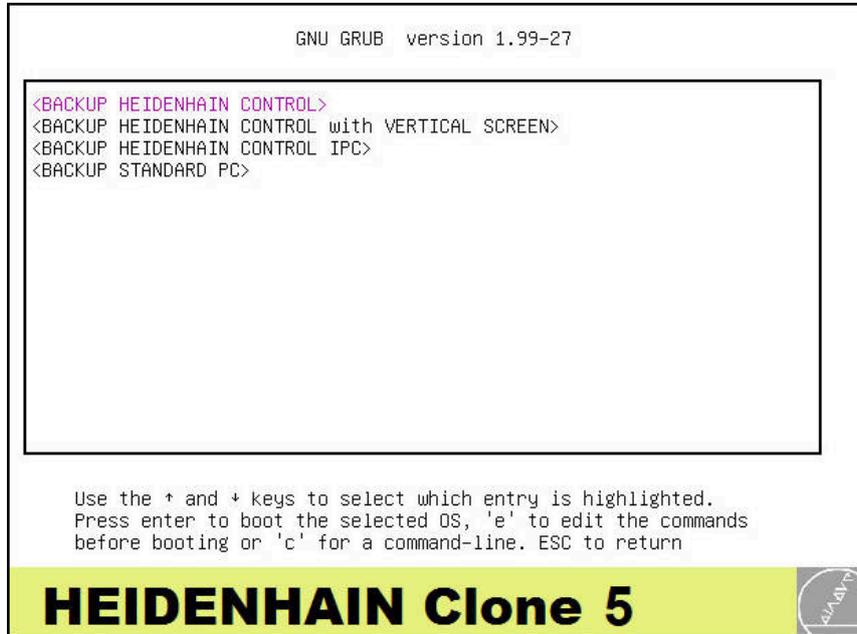
5	▶ Press the arrow key to select Exit ▶ Select Exit Saving Changes ▶ Press the Enter key ▶ Select Yes ▶ Press the Enter key again > The control restarts > HEIDENHAIN Clone is started	With the German keyboard layout, "Y" is on "Z".
---	--	---

4.2.4 Backing up data

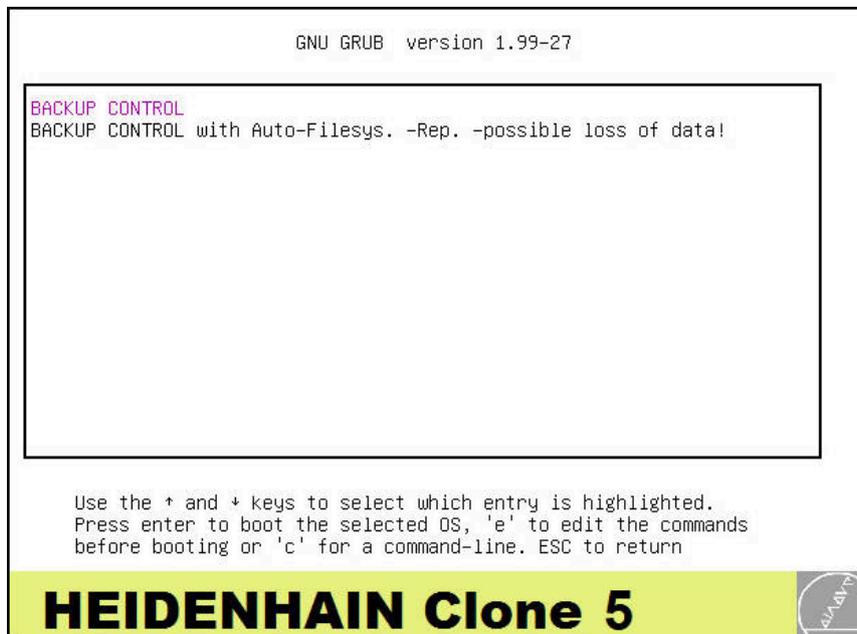
Step	Action	Info
1	<ul style="list-style-type: none"> ▶ After all steps under "Selecting BIOS settings" or "Selecting the UEFI settings" have been performed, the control restarts and the main menu of HEIDENHAIN Clone is displayed 	
2	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE BACKUP> from the main menu ▶ Press the Enter key 	<p>Additionally for MC 422C: If Press Enter to see video modes available... is displayed, press the space bar. If no key is pressed within 30 seconds, the highlighted line will be executed automatically.</p>



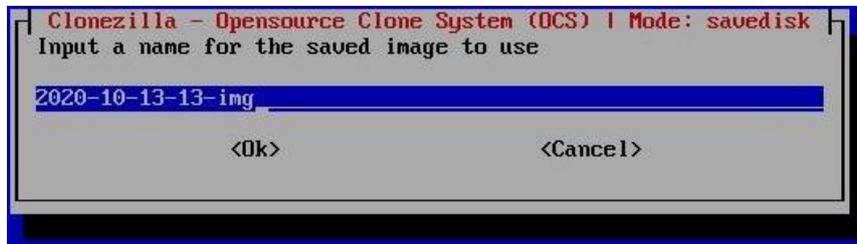
Step	Action	Info
3	▶ Select <BACKUP HEIDENHAIN CONTROL> from the menu	



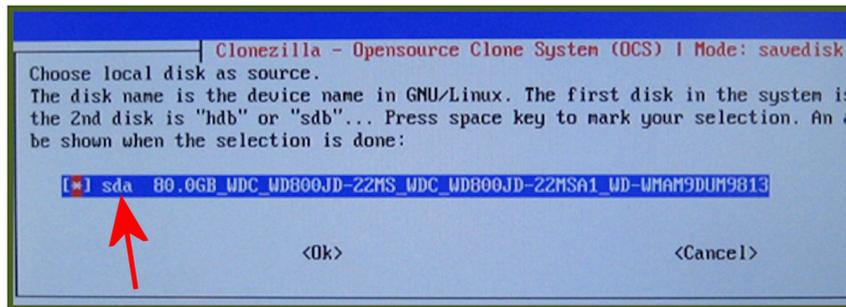
4	▶ Select BACKUP CONTROL from the menu	
---	--	--



Step	Action	Info
5	<ul style="list-style-type: none"> ▶ Enter a title for the backup ▶ Press the Enter key 	



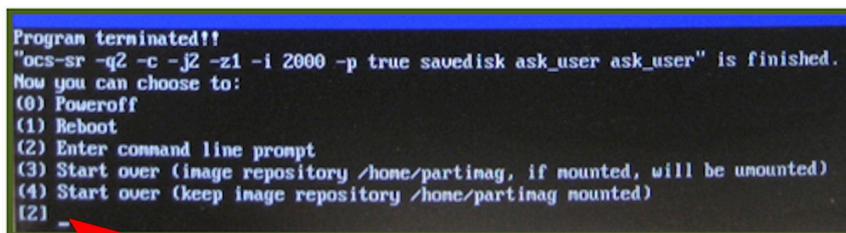
6	<ul style="list-style-type: none"> ▶ Select the hard disk of the control as source drive ▶ Press the Enter key 	
---	---	--



7	<ul style="list-style-type: none"> ▶ Enter "Y" ▶ Press the Enter key ▶ The cloning process starts 	With the German keyboard layout, "Y" is on "Z".
---	---	---

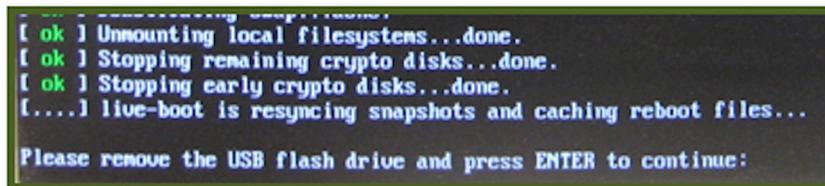


8	<ul style="list-style-type: none"> ▶ Wait until the cloning process has been completed ▶ Enter "0" ▶ Press the Enter key to switch off the control 	
---	--	--



Enter "0".

Step	Action	Info
9	<p>When the text in the figure below is displayed</p> <ul style="list-style-type: none"> ▶ Remove the HEIDENHAIN Clone USB hard disk ▶ Press the Enter key ▶ System halted is displayed ▶ Shut down the control 	



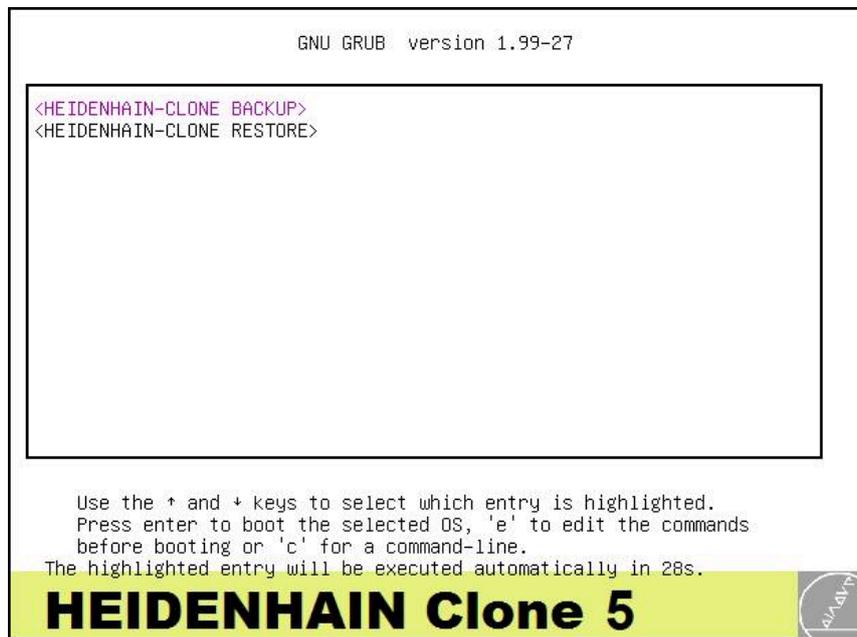
A clone of your control hard disk was created on the HEIDENHAIN Clone USB hard disk.

- ▶ Before the next start of your control, call the BIOS as described under "Selecting BIOS settings" and activate the menu item **Load Optimized Defaults**

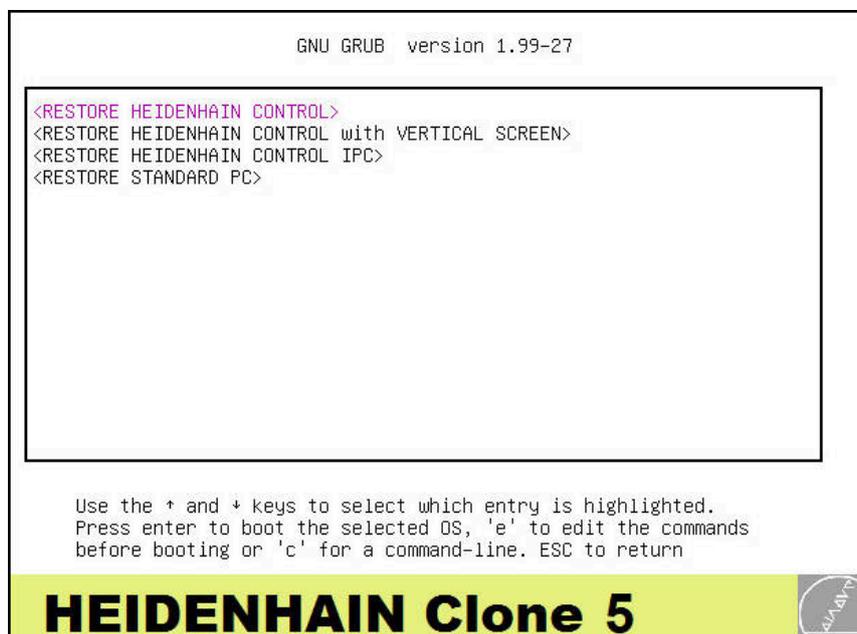
Now you can use your control as usual.

4.2.5 Restoring data

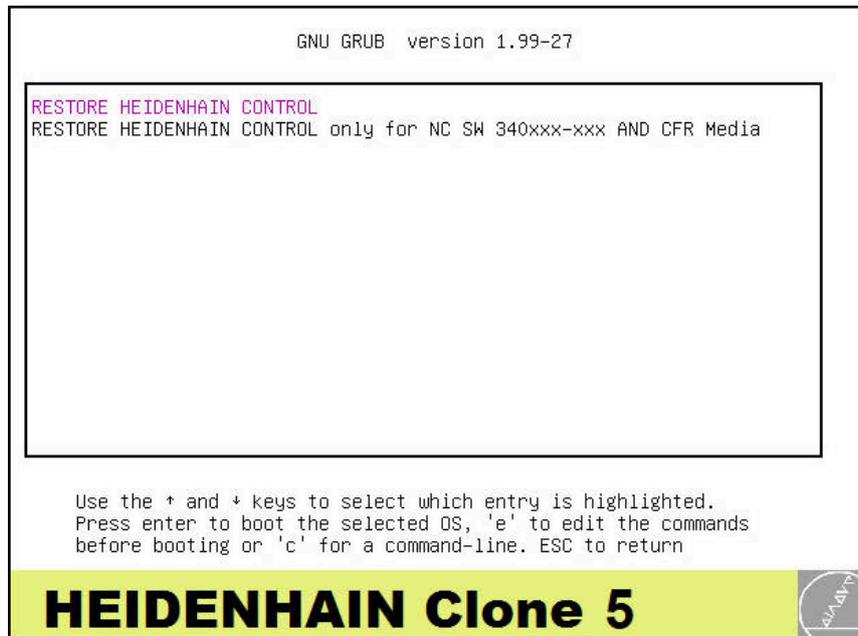
Step	Action	Info
1	<ul style="list-style-type: none"> ▶ Repeat the steps described in "Selecting BIOS settings" or "Selecting the UEFI settings" 	
2	<ul style="list-style-type: none"> ▶ Select <HEIDENHAIN-CLONE RESTORE> from the main menu ▶ Press the Enter key 	If no key is pressed within 30 seconds, the highlighted line will be executed automatically.



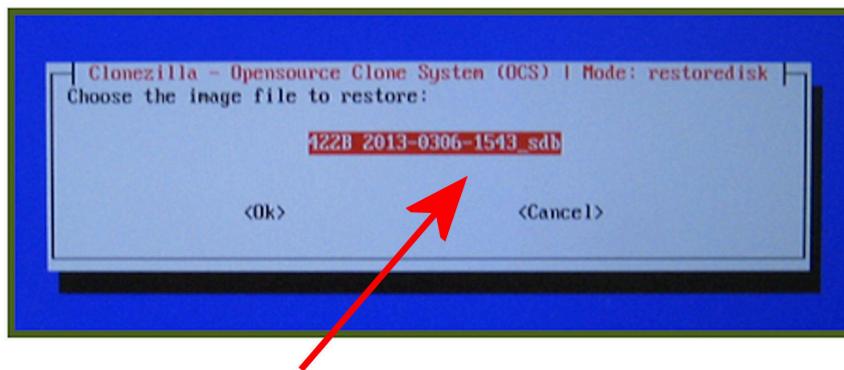
3	<ul style="list-style-type: none"> ▶ Select <RESTORE HEIDENHAIN CONTROL> from the menu ▶ Press the Enter key 	
---	--	--



Step	Action	Info
4	<ul style="list-style-type: none"> ▶ Select RESTORE HEIDENHAIN CONTROL from the menu ▶ Press the Enter key 	

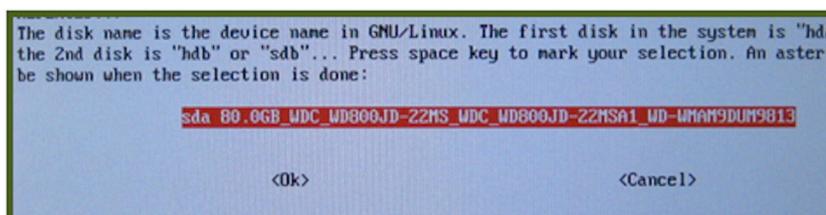


5	<ul style="list-style-type: none"> ▶ Select the created backup (see Backup) ▶ Press the Enter key 	
---	--	--



Select backup and press Enter

6	<ul style="list-style-type: none"> ▶ Select the hard disk of the control as target drive ▶ Press the Enter key 	
---	---	--



Step	Action	Info
7	<ul style="list-style-type: none"> ▶ Confirm twice with "Y" > The restore process is started 	With the German keyboard layout, "Y" is on "Z".
8	<ul style="list-style-type: none"> ▶ Wait until the restore process has been completed ▶ Enter "0" ▶ Press the Enter key to switch off the control 	

```

Program terminated!!
"ocs-sr -qZ -c -jZ -z1 -i 2000 -p true savedisk ask_user ask_user" is finished.
Now you can choose to:
(0) Poweroff
(1) Reboot
(2) Enter command line prompt
(3) Start over (image repository /hone/partinag, if mounted, will be unmounted)
(4) Start over (keep image repository /hone/partinag mounted)
[2] _
    
```

 Enter "0".

- 9 When the text in the figure below is displayed
- ▶ Remove the **HEIDENHAIN Clone** USB hard disk
 - ▶ Press the **Enter** key
 - > **System halted** is displayed
 - ▶ Shut down the control

```

[ ok ] Unmounting local filesystems...done.
[ ok ] Stopping remaining crypto disks...done.
[ ok ] Stopping early crypto disks...done.
[... ] live-boot is resyncing snapshots and caching reboot files...
Please remove the USB flash drive and press ENTER to continue:
    
```

Your hard disk has been restored and corresponds to the state of the backup.

- ▶ Before the next start of the control, call the BIOS and activate the **Load Optimized Defaults** menu item as described in "Selecting BIOS settings"

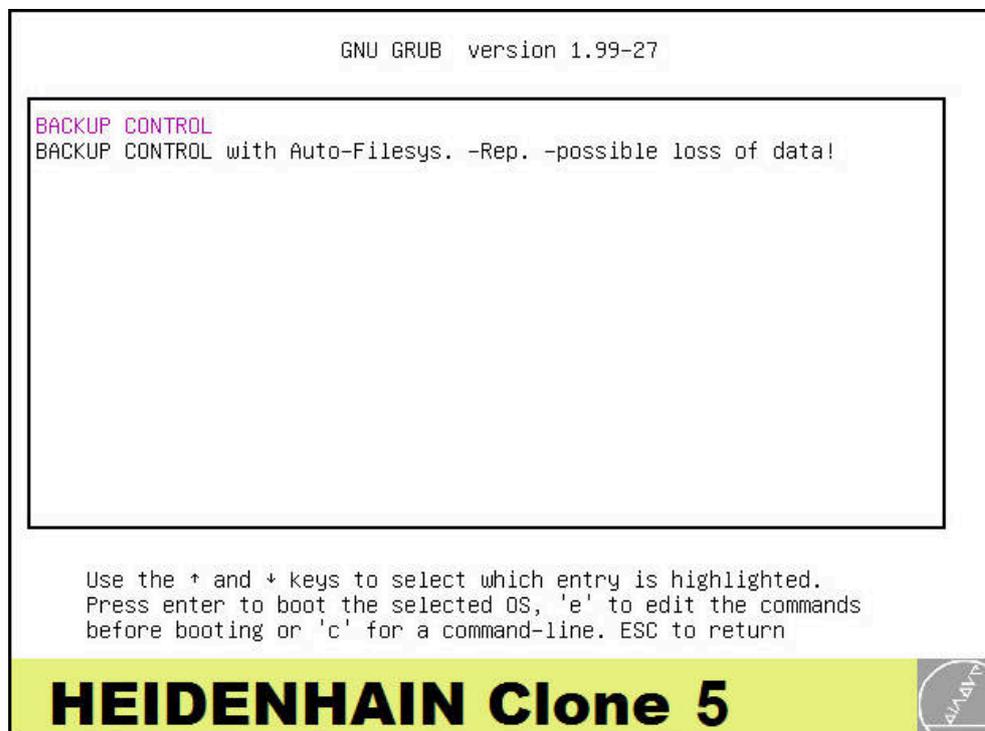
Now you can use your control as usual.

4.3 Additional functions

4.3.1 Backup control with auto file-system-repair



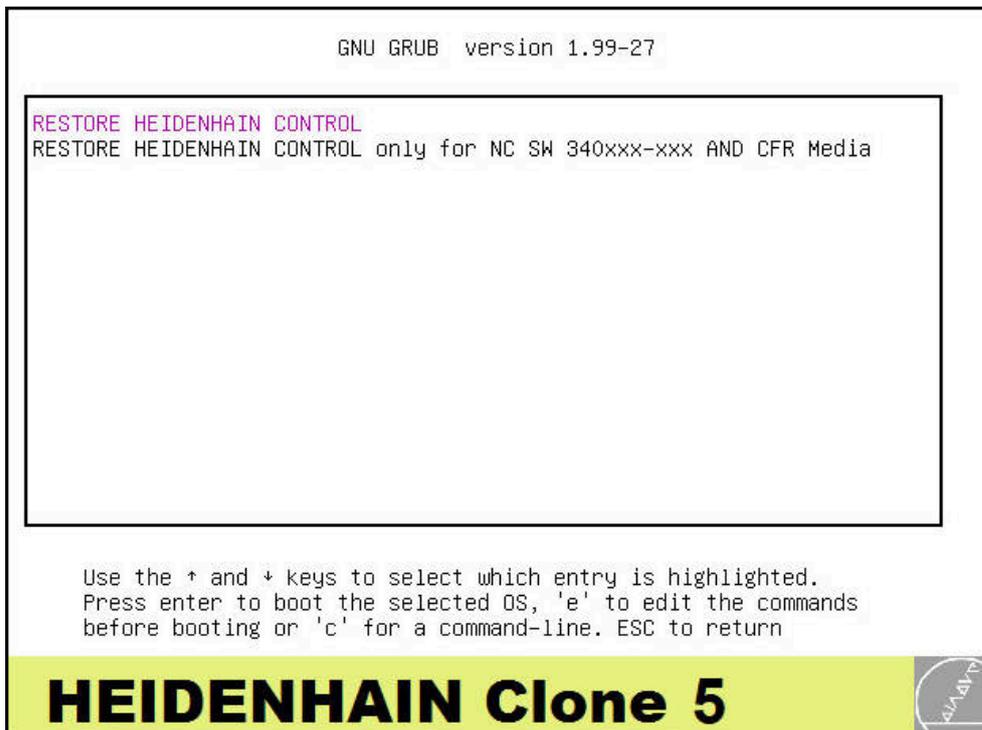
In the event of problems (e.g. error message: Partition has been mounted 28 times without being checked) during the creation of a backup, or if the control's hard disk is suspected to be defective, use **BACKUP CONTROL with Auto-Filesys. -Rep. -possible loss of data!** With this function you have at least a small chance to create a working backup although data or hardware is damaged. Success cannot be guaranteed, however. Usually, it is too late if the HDR hardware is actually defective!



- ▶ To run the function **BACKUP CONTROL with Auto-Filesys. -Rep. -possible loss of data!** select this function and follow the steps as described in **Backup**.

4.3.2 Restore only for NC SW 340xxx-xxx and CFR media

i The function **RESTORE HEIDENHAIN CONTROL only for NC SW 340xxx-xxx AND CFR Media** may only be used with an NC SW 340xxx-xxx control software in combination with a CFR card.



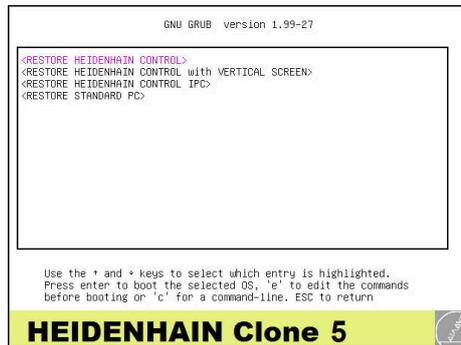
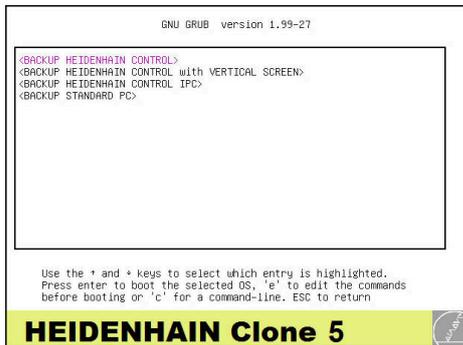
- ▶ To run the function **RESTORE HEIDENHAIN CONTROL only for NC SW 340xxx-xxx AND CFR Media**, select this function and follow the steps as described in **Restore**.

4.3.3 HEIDENHAIN control with vertical screen

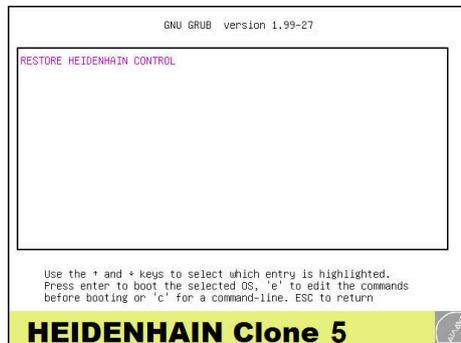
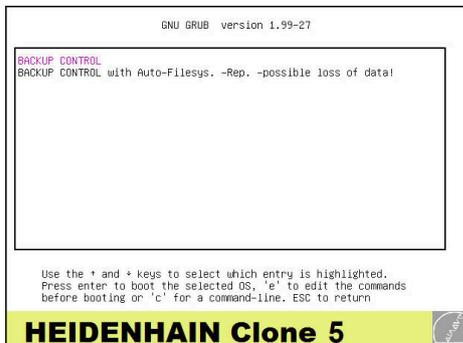
i For screens in portrait format, the function **<BACKUP HEIDENHAIN CONTROL with VERTICAL SCREEN>** or **<RESTORE HEIDENHAIN CONTROL with VERTICAL SCREEN>** must be selected.

Affected monitors:

- MC 8410 with multitouch operation
- The function may also apply to other monitors



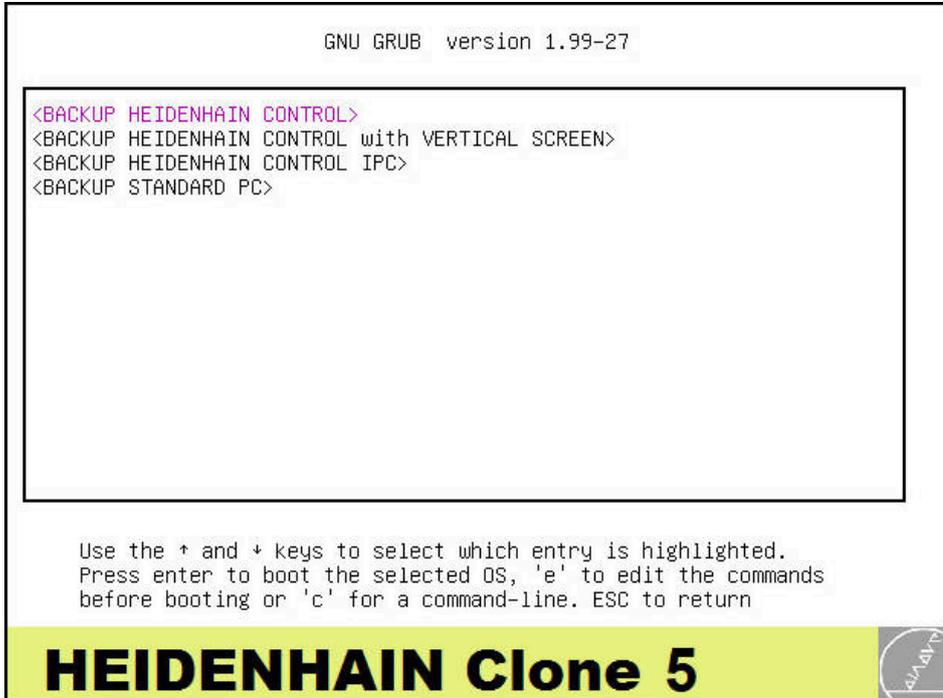
- ▶ Select the function **<BACKUP HEIDENHAIN CONTROL with VERTICAL SCREEN>** or **<RESTORE HEIDENHAIN CONTROL with VERTICAL SCREEN>**
- ▶ Press the **Enter** key



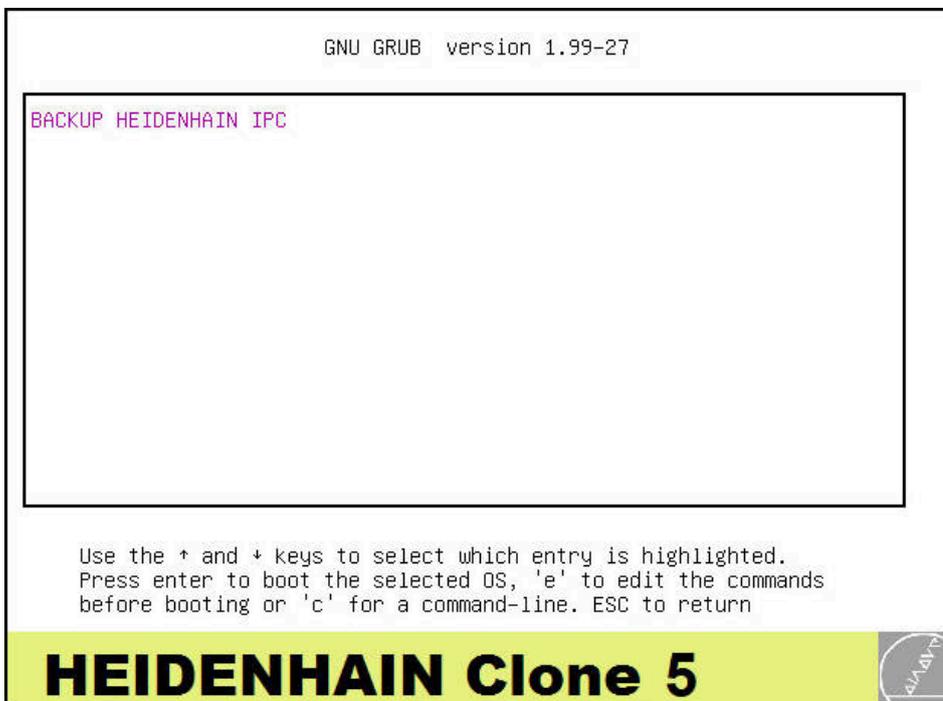
- ▶ To run the **BACKUP CONTROL** function, select this function and perform the steps as described in "Backing up data"
- ▶ To run the **BACKUP CONTROL with Auto-Filesys. -Rep. -possible loss of data!** function, select this function and perform the steps as described in "Backup control with auto file-system-repair"
- ▶ To run the **RESTOREBACKUP CONTROL** function, select this function and perform the steps as described in "Restoring data"

4.3.4 Backup HEIDENHAIN control IPC

- ▶ To run the **<BACKUP HEIDENHAIN CONTROL IPC>** function, select this function



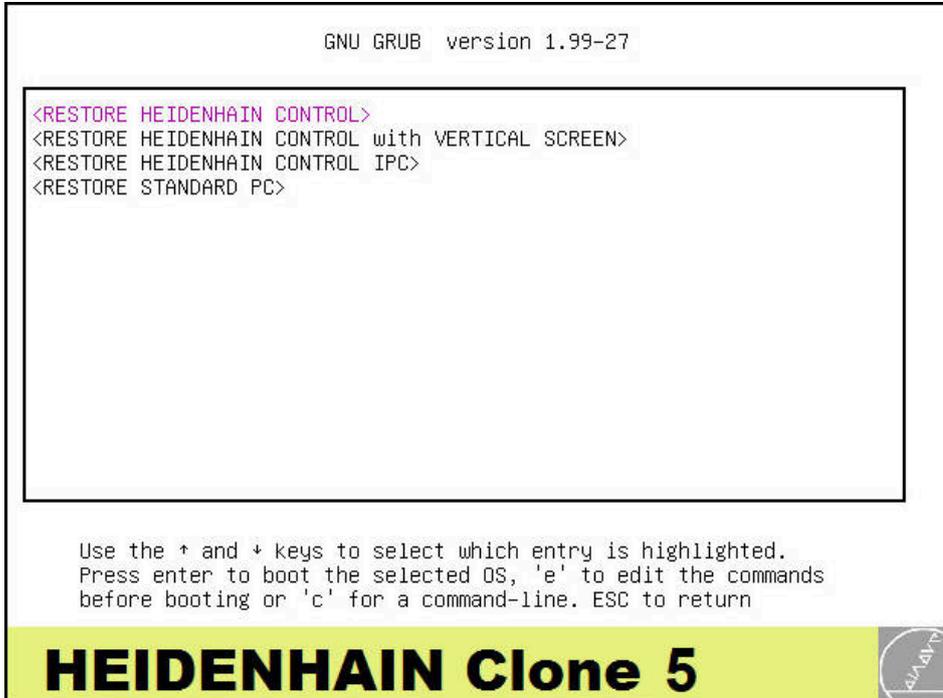
- ▶ Press the **Enter** key
- > The following option is available:



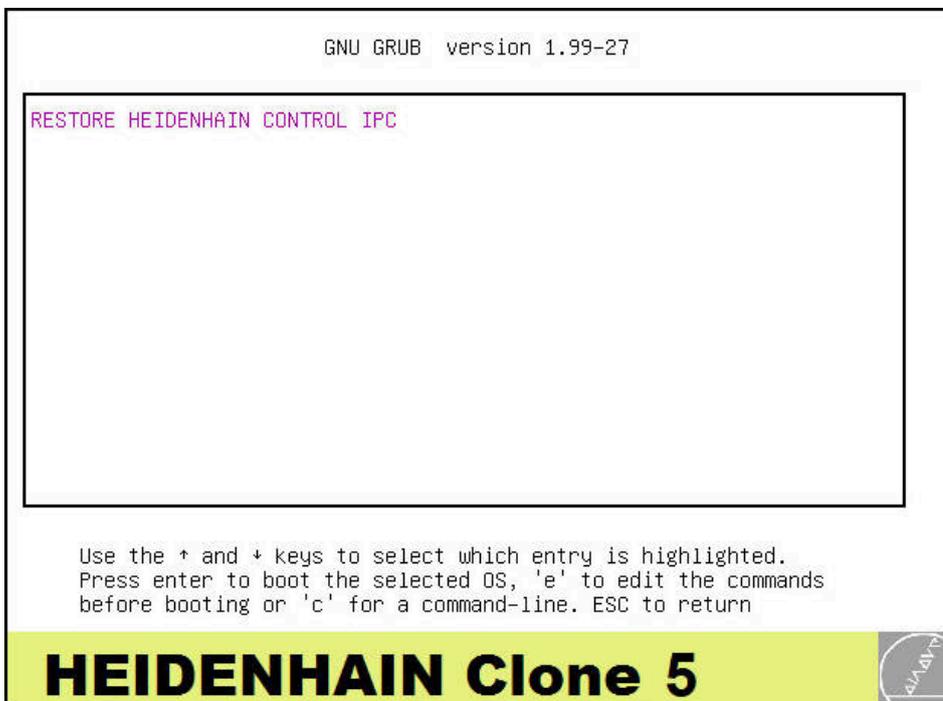
i To run the function, see chapter "Backing up data".

4.3.5 Restore HEIDENHAIN control IPC

- ▶ To run the **<RESTORE HEIDENHAIN CONTROL IPC>** function, select this function



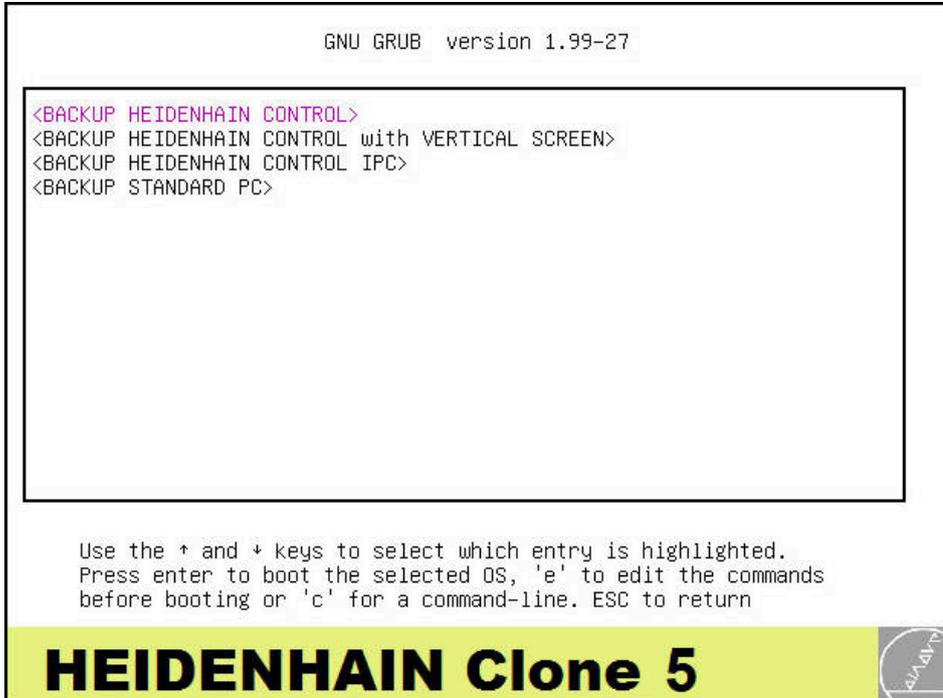
- ▶ Press the **Enter** key
- > The following option is available:



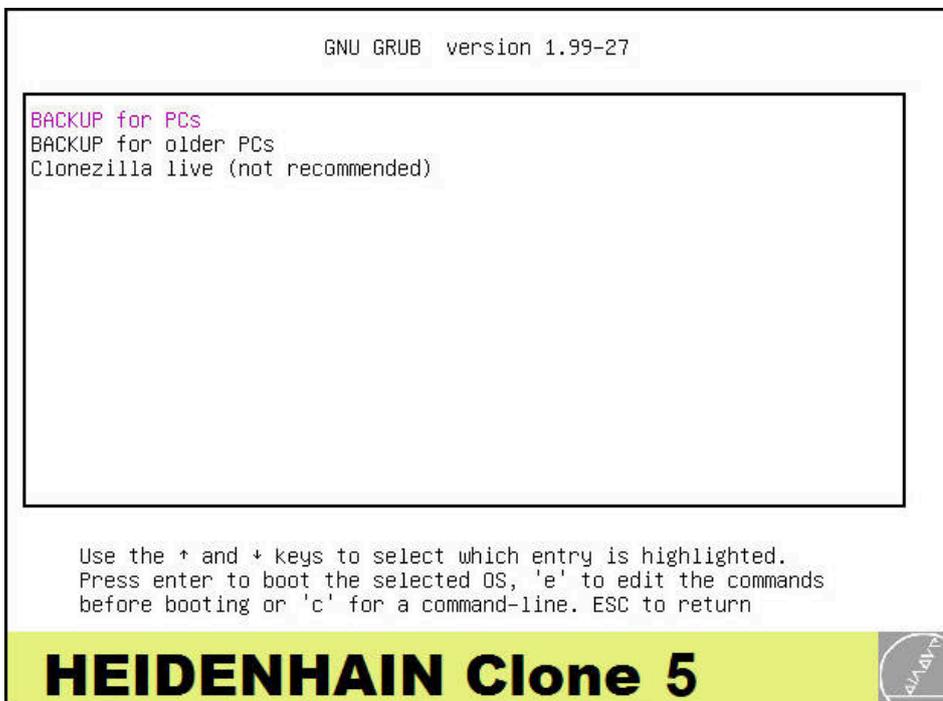
i To run the function, see chapter "Restoring data".

4.3.6 Backup standard PC

- ▶ To run the **<BACKUP STANDARD PC>** function, select this function



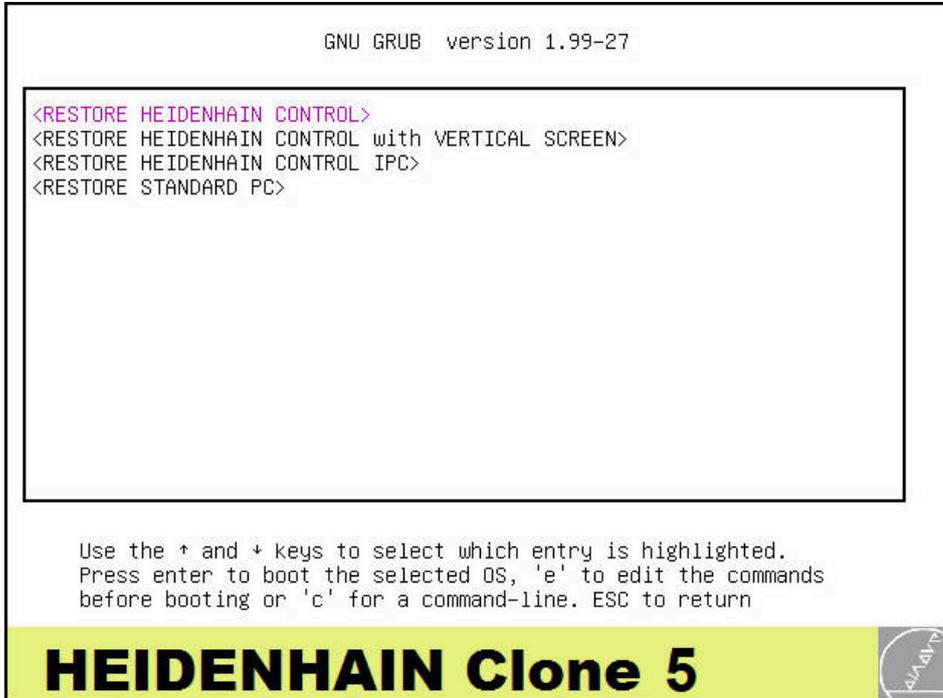
- ▶ Press the **Enter** key
- > The following options are available:



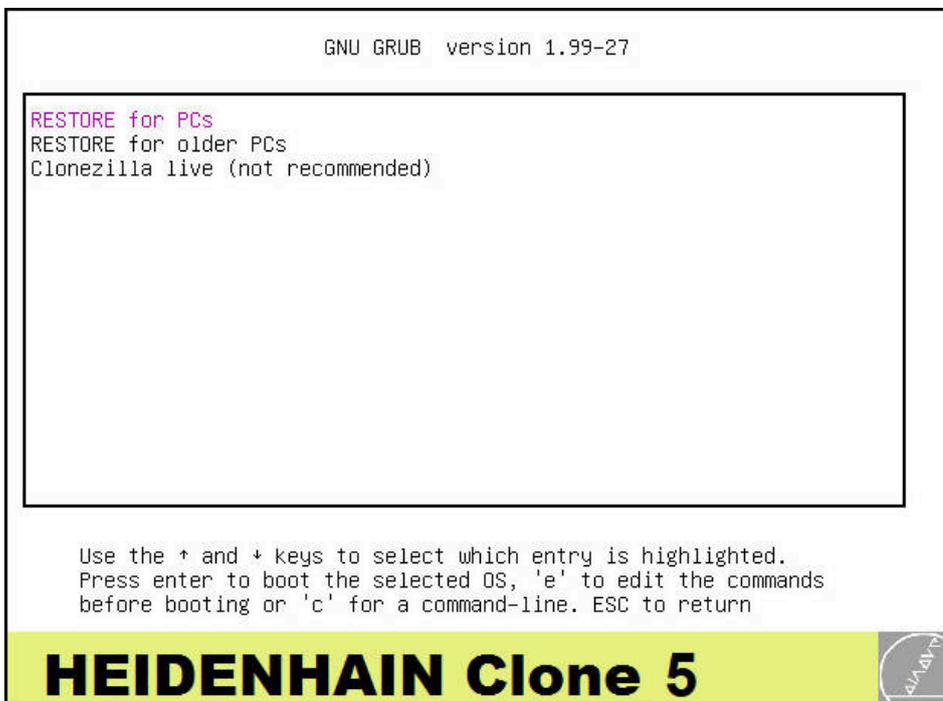
i Usually, the function **BACKUP for PCs** should be selected. If an error occurs or the screen remains black, use the function **BACKUP for older PCs**. To run the function, see chapter "Backing up data".

4.3.7 Restore standard PC

- ▶ To run the **<RESTORE STANDARD PC>** function, select this function



- ▶ Press the **Enter** key
- > The following options are available:



i Usually, the function **RESTORE for PCs** should be selected. If an error occurs or the screen remains black, use the function **RESTORE for older PCs**. To run the function, see chapter "Restoring data".

4.3.8 Clonezilla live

NOTICE

Improper use

If the **Clonezilla live (not recommended)** function is used without detailed knowledge, this can lead to data loss on the data carrier of the control, the PC or in the network.

- ▶ Only use this function if you have comprehensive Linux and IT knowledge
- ▶ Only use this function to solve problematic and special cases

i The **Clonezilla live (not recommended)** function is not required for copying data media of HEIDENHAIN controls. All settings and changes necessary for solving problematic and special cases, can be made in the Clonezilla software. The function is not described in this manual.

GNU GRUB version 1.99-27

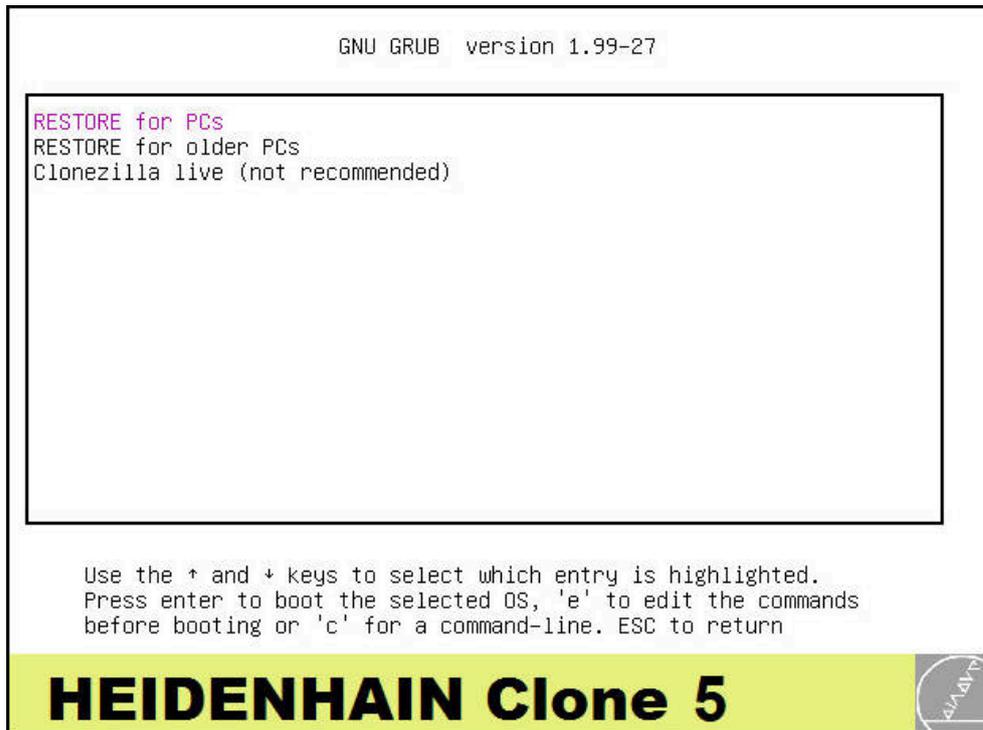
```

BACKUP for PCs
BACKUP for older PCs
Clonezilla live (not recommended)
        
```

Use the ↑ and ↓ keys to select which entry is highlighted.
 Press enter to boot the selected OS, 'e' to edit the commands
 before booting or 'c' for a command-line. ESC to return

HEIDENHAIN Clone 5

Clonezilla live (not recommended)



Clonezilla live (not recommended)

5 Managing the created backups

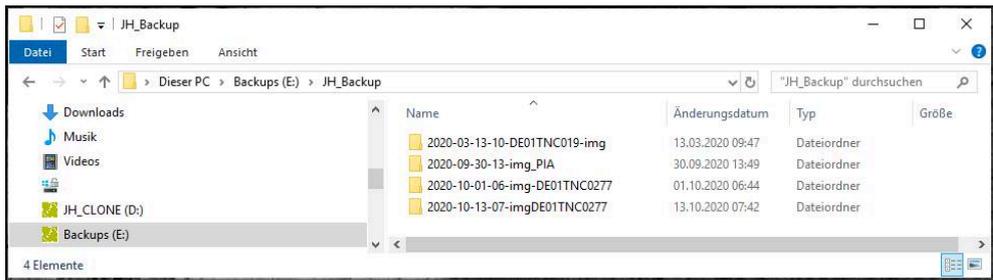
5.1 In Microsoft Windows

You can store several backups on the hard disk of the HEIDENHAIN Clone. For managing your backups you can connect **HEIDENHAIN Clone** in Microsoft Windows. After connecting the hard disk, two additional drives appear in the file system.



i Do not make any changes in the "JH-CLONE" drive!
The **HEIDENHAIN Clone** operating software is located there.

You can find your backups in the "JH_Backup" subdirectory on the "Backups" drive.



For each backup a directory with a freely selectable name is created. There you can delete or copy your backups, or move them to another file server, etc.

HEIDENHAIN

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