

7

HDDclone





HDClone 7

Manual

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1 Introduction

Thank you for choosing HDClone. It is our expressed goal to develop products that meet your standards. Therefore, should you have any suggestions for improvement, or should you for any reason be dissatisfied with the software, we would greatly appreciate your ▶ **11.3 Feedback**.

1.1 Brief Description

HDClone is a universal tool for copying storage media. Many applications of use can be completed easily and quickly with HDClone, including system migration (migration), data backup, disk images, exact 1:1 copies and data rescue. HDClone is especially suitable for the usages named in the ▶ **2 Areas of Application**.

1.2 Character Conventions

In this manual, keys on the keyboard are printed with an inverted background, for example **Esc** for the escape key or **Return** for the return key. Some keys are represented by their corresponding symbol, for example **↑** for the 'up'-key. Visual controls on the screen, particularly buttons are represented over-and-underlined with italic font, for example *next*, *back*.

1.3 Edition Overview

There are various editions of HDClone. They differ from one another by the number of features they offer, their supported device types, performance and special options. The following table shows a side-by-side comparison of each edition and its features.

Edition ¹⁾	FE	BE	SE	AE	PE	EE
Copying Speed						
Maximum speed in MB per sec.	30	50	60	∞ ²⁾	∞ ²⁾	∞ ²⁾
Device Support						
IDE/ATA/SATA hard disks	●	●	●	●	●	●
AHCI (SATA II)	●	●	●	●	●	●
USB 1.1 and 2.0	●	●	●	●	●	●
Bluetooth (HDI input device)	●	●	●	●	●	●
Hard disks > 2048 GB (2 TB)	○	●	●	●	●	●
USB 3.0 (XHCI)	○	○	●	●	●	●

Edition ¹⁾	FE	BE	SE	AE	PE	EE
Firewire / IEEE1394 (OHCI)	○	○	○	●	●	●
NVMe (PCIe and M.2)	○	○	○	●	●	●
Intel & NVIDIA Software RAID 0/1/10/5	○	○	○	○	●	●
Dynamic disks	○	○	○	○	●	●
ATA-Password unlock	○	○	○	●	●	●
TRIM command for faster SSDs	○	○	○	●	●	●
SCSI hard disks	○	○	○	○	●	●
SATA-Hotplug & Port-Multiplier	○	○	○	○	○	●
Copy Modes						
Drive copy	●	●	●	●	●	●
Partition copy	○	●	●	●	●	●
SmartCopy	○	○	●	●	●	●
PartitionSelect	○	○	●	●	●	●
BitCopy	○	○	○	○	●	●
MultiCopy (4x, 8x, 16x)	○	○	○	○	○	●
File Images						
Physical images	●	●	●	●	●	●
SmartImage	○	○	●	●	●	●
Compressed images	○	○	●	●	●	●
Password protected images	○	○	●	●	●	●
Differential images	○	○	○	●	●	●
QuickCompress	○	○	○	●	●	●
StrongCompress	○	○	○	○	●	●
Securely encrypted images	○	○	○	○	●	●
RAW images	○	○	○	○	●	●
Dynamic VMDK/VHD(X)/VDI images	○	○	○	○	●	●
Special Modes						
HotCopy	●	●	●	●	●	●
LiveImage	○	●	●	●	●	●
SafeRescue mode	○	●	●	●	●	●
Advanced Format / 4K conversion	○	●	●	●	●	●
Verification mode	○	○	●	●	●	●
FastCopy mode	○	○	○	●	●	●
Command line interface	○	○	○	○	●	●
Storing a clone report (TXT & PDF)	○	○	○	○	●	●

Edition ¹⁾	FE	BE	SE	AE	PE	EE
Variants						
HDClone/W (Windows application)	●	●	●	●	●	●
HDClone/W64 (64 bit application)	○	○	○	○	●	●
HDClone/S (self-booting)	●	●	●	●	●	●
HDClone/L (self-booting, Linux basis)	○	○	○	○	●	●
File Systems						
NTFS, FAT SmartCopy/SmartImage	●	●	●	●	●	●
NTFS, FAT enlargement	●	●	●	●	●	●
NTFS, FAT reduction	○	●	●	●	●	●
NTFS, FAT defragmentation	○	○	●	●	●	●
HFS+, ExFAT SmartCopy/SmartImage	○	○	○	●	●	●
HFS+, ExFAT enlargement	○	○	○	●	●	●
HFS+, ExFAT reduction	○	○	○	●	●	●
HFS+, ExFAT defragmentation	○	○	○	●	●	●
ReFS, XFS, ext SmartCopy/SmartImage	○	○	○	○	●	●
ReFS, XFS, ext enlargement	○	○	○	○	●	●
Miray Virtual Disk						
Virtual volumes	○	1	1	7	7	7
File image management	○	1	1	●	●	●
Persistent virtual disks	○	○	○	○	●	●
Writeable virtual disks	○	○	○	○	●	●
Virtual volumes @ TrueSpeed ³⁾	○	○	○	○	●	●
Mounting VMDK/VHD(X)/VDI images	○	○	○	○	●	●

¹⁾ Within the table the following abbreviations are used to identify the different editions:

FE = Free Edition, **BE** = Basic Edition, **SE** = Standard Edition, **AE** = Advanced Edition,

PE = Professional Edition, **EE** = Enterprise Edition

²⁾ No software speed limit.

³⁾ Use of RAW images at nearly hardware speed.

2 Areas of Application

HDClone specializes in creating physical and logical 1-to-1 clones and file images. Therefore, HDClone offers specific advantages for copying, and respectively rescuing defective media (▶ 2.2 Data Rescue). HDClone can even copy disks or save them to an image, regardless of the partitioning scheme, the file system used or the installed operating system. This way, HDClone can copy entire system installations (▶ 2.1 Upgrading Hard Disks & Migrating an OS) or even proprietary file systems (▶ 2.6 Proprietary Formats) exactly. Altogether, HDClone covers a wide spectrum of available applications through its universal copying technology. The following text describes the most common application uses of HDClone. Descriptions of frequently used applications are listed below.



Hint: HDClone allows you to copy data randomly among all types of recognized media, particularly between different types of drives.

2.1 Upgrading Hard Disks & Migrating an OS

Because HDClone works independently from any file system formats or operating systems, it can be used to migrate entire installations, including the installed operating system, to another hard disk. This is especially useful in order to migrate an existing installation to a new hard disk without having to re-install the operating system and application. For this type of application, a SmartCopy (or Full-Copy) of the entire hard disk is most suitable. Use the PartitionSelect feature to choose the individual partitions to be cloned.



Note: Please ensure that only one hard disk is connected after completing the copy, and before starting the operating system. It should be plugged in to the same channel as the original. Therefore, either the copy must be removed, or it may be connected in place of the source media.

2.1.1 Unused Disk Space

Free disk space on the target media can be converted into a partition and used as an additional drive from within Windows by use of the `fdisk` tool or the Windows Computer Management (C:\WINDOWS\system32\compmgmt.msc).

2.1.2 Smaller Target Media

Copies can be made from larger to smaller media. HDClone has the ability to decrease your NTFS and FAT partition size automatically while copying. For other file systems, you can downsize the partitions on the original media before cloning, using appropriate third-party tools.

2.2 Data Rescue

In case of hard disks with defective areas, it is especially important that they are first rescued onto intact media before starting any recovery attempts. Otherwise, depending on the kind of defect, the recovery procedure may cause further defects resulting from the inherent exposure of this procedure. Of course, using HDClone also causes exposure to the hard disk. Yet the physical copying causes much less exposure than any other usage due to its linear operation, i.e. only linear movement of the disk's heads. Furthermore, the option **SafeRescue** keeps exposure to an absolute minimum. In very critical cases, you can also copy single partitions in order to reduce exposure to the media even more. After rescuing the data from the defective hard disk, you can then perform a recovery on the (functional) target media without risking any further damages.



Important: For the purpose of data rescue, first create a FullCopy or BitCopy of the entire hard disk (or a FullImage or RAW images, respectively). This clone can then be used to conduct recovery attempts without any risk to the original data.



Note: Only a physical copy allows you to rescue all of the data (except for irrecoverable areas), even if there are logical errors resulting from defective areas. For this reason, never use SmartCopy mode for rescuing data.



Hint: Alternatively, you may create a RAW image, or a physical image. You can then restore the image to another hard disk later on, or you can perform the recovery directly on the image by mounting it as a virtual drive using ▶ 10 Miray Virtual Disk.

2.3 Installation Backup

HDClone can also create a local backup of an entire system installation. If required, a simple restoration from the backup partition will bring the system installation back to its original state – without any previous affliction of faulty program installations, viruses, etc. In addition to the system partition, create an unused partition of at least the same size as a backup partition. Then create a file image from which to restore the original system when needed.



Note: Before restoring from the backup partition, save your work files and other data from the system partition, or store them elsewhere as they will otherwise be overwritten.

2.4 Mass Copying

HDClone Enterprise Edition was specifically designed to create up to 16 copies at one time. This makes it especially suitable for industrial duplication of pre-installed software (e.g. hard disks or CompactFlash media), or to create several identical operating system installations (▶ 2.5 Master Installations).

2.5 Master Installations

HDClone is also optimal for duplicating (deployment) system installations (▶ 2.4 Mass Copying). You may copy an entire disk master directly or from a file image to the target media in order to use it directly from there.



Note: To duplicate Windows installations, we recommend running the Microsoft tool `sysprep` prior to cloning. Further information can be found at <http://www.microsoft.com>, search for 'sysprep'.

2.6 Proprietary Formats

HDClone is capable of copying arbitrary hard disk formats. Especially for hard disks installed in proprietary systems (e.g. studio technology, medical technology etc.), there are often no programs aside from system software, which can read the data on these media. HDClone can rescue this data and transfer it to a new media without any problem. The best way to achieve this is to copy the source media to a target media of the same or larger size. Any target media smaller than the source should not be used, as the transfer of all relevant user data cannot be assured in this case.



Note: With unknown or proprietary (non-standardized) formats, always copy the entire source media. Only use the **Cloning Partitions** mode if you are certain that the partitions are reported correctly.

2.7 Forensic Examination

HDClone also serves to secure data for forensic purposes, as all data from a disk is copied completely - including data that has possibly been hidden or deleted. This data can no longer be reached via the usual file system mechanisms. Therefore it is advisable to create a copy in BitCopy mode or as a RAW image before performing a detailed forensic examination of secured disks. This allows you to make changes to the copy during analysis without altering and thereby endangering the original content of the media.



Note: When backing up data for forensic examination, hidden and deleted files can be located anywhere on the media, the creation of a copy of the entire media to a target media of the same or larger size is always required. **Never use SmartCopy mode** for this type of application.

2.8 Image Files

In HDClone, working with physical and logical images follows the same basic logic as physical and logical copies, which are performed directly from one storage media to another. File images offer the following advantages:

- Simple storage and management of your file system
- Optional compression onto minimally required space
- Password protection and AES encryption to protect data
- Use random storage media for exchange
- Distribution without physical media via networks and the internet
- Access of individual files via virtual drives (▶ 10 Miray Virtual Disk)
- Virtual machines



Example: To rescue a defective hard disk, you may create a physical FullCopy instead of a physical FullImage. In both cases, this will result in a bit-wise identical clone of the master hard disk.

2.9 HotCopy & LiveImage

HDClone supports the creation of clones or images of a Windows drive while Windows is running - even of the Windows system partition itself. To use this feature, it is not necessary to take any additional steps. When using HDClone/W, the appropriate mechanisms for using HotCopy and LiveImage will be activated automatically.

3 Variants

HDClone comes in three variants – HDClone/W, HDClone/S and HDClone/L. All variants contain the same program software, meaning the same user interface. Generally, the program operation and functions are identical, yet they run on different operating systems. Therefore, the main difference is the device support, which may affect the program functions in the respective variant. The system requirements for each variant are described below.



Note: The following information represents the entire spectrum of the systems supported by HDClone. The actual availabilities of each edition are listed in the ▶ [1.3 Edition Overview](#).

3.1 HDClone/W

This variant runs as normal Windows application (.exe) and can therefore simply be executed on a running Windows PC parallel to other programs, or it can be executed via Windows PE even without Windows being permanently installed.

3.1.1 Supported Systems

HDClone/W runs on PCs (x86 + x64) with the following versions of Windows:

Workstation

- Windows XP (32+64 bit) *
- Windows Vista (32+64 bit)
- Windows 7 (32+64 bit)
- Windows 8 (32+64 bit)
- Windows 8.1 (32+64 bit)
- Windows 10 (32+64 bit)

Server

- Windows Server 2003 (32+64 bit) *
- Windows Server 2008 (32+64 bit)
- Windows Server 2008 R2 (64 bit)
- Windows Server 2012 (64 bit)
- Windows Server 2012 R2 (64 bit)
- Windows Server 2016 (64 bit)

*) We reserve the right to limit or suspend support for Windows XP and Server 2003 in future versions of HDClone 7 in favor of technical innovations which are not implementable thereon.

3.1.2 Supported Devices and Storage Media

All devices or mass storage media that are supported on Windows, or on which an appropriate Windows driver has been installed.

3.2 HDClone/S

The original variant of HDClone runs self-booting on PC's and Macs (x84 compatible) on the base of our Symobi OS. It is employed especially when achieving the highest possible copying speed or if Windows is not executable. The systems, controllers and devices that are supported are listed below.

3.2.1 Supported Systems

- PC Pentium III or higher, 500 MHz, 512 MB RAM, VGA/VESA
- Keyboard & mouse: PS/2, USB or Bluetooth
- Bootable CD drive or USB bootability

3.2.2 Supported Hardware Standards

HDClone/S supports the hardware standards listed below and thereby principally all devices that utilize these standards.

- PCI-IDE controller and Bus Master IDE controller
- Adaptec PCI-SCSI host adapter (▶ 4.4 SCSI and SAS)
- SATA controller with IDE interface
- SATA-II & SATA-6G controller (AHCI controller)
- USB 1.1 (UHCI & OHCI controller)
- USB 2.0 (EHCI controller)
- USB 3.0/3.1 (XHCI controller)
- Bluetooth (USB-HCI controller, HID class)
- Firewire / IEEE1394 (OHCI controller)
- Intel Onboard RAID (SATA-RAID controller)
- M.2 (SATA- & NVMe controller)
- PCI (NVMe controller)

3.2.3 Supported Storage Devices and Media

- IDE/ATA SSDs & hard disks, CompactFlash via IDE ¹⁾
- SATA SSDs & hard disks (internal & external)
- PCIe and M.2 SSDs
- Intel Software RAID (0, 1, 10, 5)

- SCSI hard disks (internal & external)
- USB sticks ²⁾
- USB hard disks and SSDs (internal & external) ²⁾
- Firewire hard disks (internal & external)
- SD ³⁾, microSD ³⁾, SDHC ³⁾ and MMC ³⁾
- CompactFlash I ³⁾, CompactFlash II ³⁾
- MicroDrive ³⁾, xD-Picture Card ³⁾
- Memory Stick ³⁾, Memory Stick PRO ³⁾, Memory Stick DUO ³⁾

¹⁾ CompactFlash media with TrueIDE support

²⁾ must support the USB-Mass-Storage-Class protocol

³⁾ connected over a USB card reader or an equivalent adaptor

3.3 HDClone/L

Professional Edition and up

Just as with HDClone/S, this variant also runs self-booting on our Symbi OS, yet on the basis of Linux. Many WLAN adapters and RAIDs can thereby be used without an executable Windows program and without Windows PE.

3.3.1 Supported Systems

- PC with 64 bit CPU (x64), 500 MHz, 512 MB RAM, VGA/VESA
- Keyboard & mouse: PS/2, USB or Bluetooth
- Bootable CD drive or USB bootability

3.3.2 Supported Storage Devices and Media

All devices and mass storage media that are supported directly by Linux Kernel Version 4.7.

4 Compatibility

Additional information and tips for the use on various types of devices are listed below.



Hint: In order to check if your devices are supported prior to the purchase of HDClone, start HDClone Free Edition on the respective PC and open the **SpeedTest** app in the **Tools** group. In the list to the left side you will be able to see which disks are actually available. You may also execute a speed test for these disks.

4.1 Device Standards

To support a wide spectrum of devices, HDClone/S implements the official interface standards for the particular device types. In addition, we perform extensive tests with each type of device. Though should you experience any issues, in most cases these can be resolved by setting the options appropriately (see ▶ 9 Troubleshooting). The event that this does not solve the issues, our Support Team (▶ 11.4 Support) will be glad to help you.

4.2 Transfer Rates

The achievable speed primarily depends on the disk's capabilities, for which the following approximate classifications can be made:

Type	Age	Transfer Rate
Older drives	~ 5-10 years	~ 10-60 MB/sec
Newer drives	~ 3-5 years	~ 40-120 MB/sec
Top models	~ 0-3 years	~ 80-180 MB/sec and more
USB 2	~ 0-5 years	~ 10-40 MB/sec
USB 3	~ 0-3 years	~ 10-150 MB/sec and more
SSD's	~ 0-2 years	~ 90-300 MB/sec and more
PCIs SSDs	~ 0-2 years	~ 200-1,500 MB/sec and more



Note: The speed also depends on other system components, for example on USB SATA bridges and on the variant of HDClone that is being used. The best speed is mostly achieved by HDClone/S. Should the speed deviate strongly from the expected value, please find further tips in chapter ▶ 9.6.2 Decelerated System.

4.3 SATA

HDClone supports SATA-, SATA-II and SATA 6G disks. We recommend setting SATA controllers in BIOS to operating modus **AHCI** (instead of **IDE**). Should the IDE mode be needed by the installed operating system, **IDE** can be reset after completion of the copying process.

4.3.1 SATA-Hotplug

Enterprise Edition required

To connect SATA devices to a running system (hot-plugging), the SATA controller has to be set to **AHCI** (instead of **IDE**) operating mode in BIOS, and the ports to be used for hot-plugging must be set to **Hotplug**. Alternatively, SATA ports can also commonly be used for hot-plugging when they have a SATA device connected at power-on.



Warning: It is absolutely essential to first set the AHCI operating mode for the SATA controller in BIOS. In IDE operating mode, the plugging of devices into a running system usually causes a system crash.

4.3.2 Port-Multiplier

Enterprise Edition required

A port multiplier allows the connection of several SATA devices to a single SATA port, thereby sharing the transfer rate of the port. This enables the connection of more SATA disks than native SATA ports are available at one time. Disks connected over a port multiplier will be recognized and displayed automatically.

4.4 SCSI and SAS

Professional Edition and up

SCSI and SAS disk are supported by HDClone/W and HDClone/L as long as there is an appropriate driver. Only the following Adaptec Narrow, Wide, Ultra and Ultra-Wide SCSI controllers are supported by HDClone/S:

AHA-2930U	AHA-2940 Ultra	AHA-2940UW	AHA-2940AU
AHA-2944UW	ASC-19160	ASC-29160	ASC-29160LP
ASC-29160N	ASC-39160		



Hint: Use the Free Edition in order to determine whether your SCSI/SAS controller is supported (▶ **4 Compatibility**). If HDClone recognizes the connected drive, the SCSI/SAS controller is supported.

4.5 RAID

Professional Edition and up

HDClone can also clone RAIDs. There are three different variants:

- RAID to normal disk
- RAID to RAID
- Normal disk to RAID

Cloning pure data RAIDs does not require any prior action. This also applies to cloning bootable system installations from a RAID to a normal media or to a RAID for the same type of RAID controller. Cloning bootable system installations to a RAID requires assurance that a software driver for the target RAID has been installed on the same source as a boot driver before starting with cloning.

4.5.1 Hardware RAID

Basically, mass storage media that are available on Windows and Linux are useable with HDClone/W and HDClone/L, this generally includes RAIDs. They present as normal disks and can be copied with HDClone. HDClone clones these RAIDs just as it would be normal drives. The special RAID substructure is hidden by Windows. Special RAID properties are therefore invisible to HDClone/W and HDClone/L.

4.5.2 Intel RAID

Since 2003, Intel offers chipsets with support for software RAIDs, which we will refer to as Intel RAIDs for our purposes here. HDClone/S allows to clone from, to and between Intel RAIDs. For this purpose, RAIDs have to be connected to the internal Intel SATA controller in their original configuration. The drive list shows available RAID volumes as disks. Only complete and sound RAIDs can be used as a target.

4.6 USB

HDClone can be used with USB devices of the USB versions 1.1 (UHCI, OHCI), 2.0 (EHCI) and 3.0 (XHCI). HDClone supports USB mass storage media (USB Mass Storage Class), USB keyboards, mice (HID) and USB hubs.

4.7 Firewire (IEEE1394)

Professional Edition and up

HDClone works with any Firewire drive or Firewire card reader which supports the Serial-Bus-Protocol (SBP).



Note: Please ensure to connect Firewire devices prior to starting HDClone, and if possible directly to the PC or to the Firewire controller.

4.8 Bluetooth

An HID-capable USB Bluetooth adapter (internal or external) is necessary in order to use Bluetooth-connected input devices (keyboard, mouse, etc.) with HDClone. Devices must be connected to the PC prior to using the program. The self-booting HDClone variants take care of this automatically upon starting.

4.9 NVMe

Professional Edition and up

The NVMe interface is used by modern SSDs and it allows high transfer rates in particular. HDClone supports NVMe disks, regardless of their structure, i.e. as M.2 or PCIe card.

4.10 M.2

The term "M.2" describes a form factor for expansion cards, yet it is oftentimes synonymous with an NVMe interface. Yet actually, SATA or USB-3 devices can be connected via M.2. Therefore, the support with M.2 cards conforms to the device interface and the HDClone edition used (▶ [1.3 Edition Overview](#)).

5 Quickstart

You can use HDClone in two variants: as a Windows application (HDClone/W) or as a self-booting program (HDClone/S and HDClone/L).



Note: Further information on launching the program can be found under ▶ **6 Installation** and ▶ **7 Program Startup**. Information on how to use HDClone can be found under ▶ **8 Inline Help**.

5.1 Windows

Please take the following steps to start HDClone in Windows:

1. Start the setup for Windows (`setup.exe`) and follow the instructions. Accept the default settings.
2. When setup is finished, HDClone will start automatically. Alternately, you can start HDClone from the Desktop or the Windows Start Menu.
3. After starting HDClone, select the desired function and follow the course of the program. For further information, please refer to ▶ **8 Inline Help**.

5.2 Self-booting

To start (=boot) HDClone without Windows, the following steps are required:

1. If you already have a bootable media (CD/DVD or USB stick) with HDClone, please proceed with step 4.
2. Plug a USB stick into your PC or insert an empty CD/DVD into your CD/DVD writing drive. Start the Boot-Setup under:
Programs ▶ *HDClone...* ▶ *Create bootable media*
3. Select the desired CD/DVD drive or the desired USB stick and create a bootable media.
4. Boot from this media on your desired PC and select **S** for HDClone/S or **L** for HDClone/L from the home screen.
5. When the main program screen opens, select the desired function and follow the course of the program. For further information, please refer to the ▶ **8 Inline Help**.

6 Installation

HDClone comes in three variants (▶ 3 Variants). Use ▶ 6.1 Setup for Windows to install HDClone/W in Windows and/or create a bootable media (HDClone/S + HDClone/L) with ▶ 6.2 Boot-Setup or as described in ▶ 6.4 ISO Image.



Note: Should you have obtained HDClone on a media (CD/DVD or USB stick), you can start HDClone/W and/or HDClone/S directly from there (▶ 7 Program Startup).

6.1 Setup for Windows

Start `setup.exe` in order to install HDClone on Windows. On the home screen, select Quick Install to install HDClone with all of its options, or select User-defined to select the options yourself (▶ fig. 1). Afterwards, select Next to follow the setup steps. Upon completion, ▶ 6.2 Boot-Setup will start in order to create an HDClone bootable media.

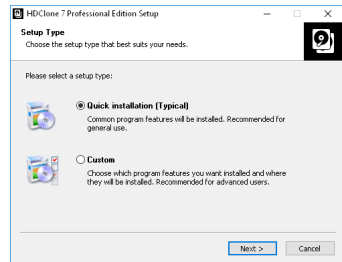


fig. 1: HDClone Setup start screen

6.1.1 Miray Virtual Disk

Some editions include the ▶ 10 Miray Virtual Disk software. In order to exclude it from installation, select Custom on the first screen (▶ fig. 1) and remove the check mark next to Miray Virtual Disk on the second screen.

Miray Virtual Disk contains the (Miray Storage Controller) device driver, which displays virtual drives as actual drives. When Miray Virtual Disk is installed, the Windows Security dialog will appear at the end of the process (▶ fig. 2). Click Install in order to verify the establishment of the device driver.

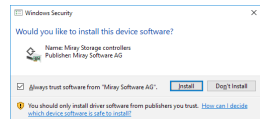


fig. 2: Windows dialog driver installation

In Windows XP, confirm the Hardware Installation popup (▶ fig. 3) by selecting Continue Anyway. If Windows opens the Found New Hardware Wizard (▶ fig. 4), close it by selecting Cancel.



fig. 3: Windows Hardware Installation



fig. 4: Windows Hardware Wizard

6.2 Boot-Setup

The boot setup (▶ fig. 5) creates a bootable disk (CD/DVD or USB stick) from which HDClone/S and HDClone/L can be booted. Start Boot-Setup one of three ways:


- Once ▶ 6.1 Setup for Windows) is completed, the boot setup will be located under Programs ▶ HDClone... ▶ Create bootable media.
- Start HDClone and then click on the Toolbox symbol  or press the **F6** key and select Boot-Setup.
- Start HDClone from the program package, then select the button Create bootable media.



fig. 5: Boot-Setup

The Boot-Setup window offers these options:

- **Select target:** Select the desired type (USB or CD/DVD) and a drive from the drop-down box. Drive lists are updated automatically. Alternately, you may select an ISO image to be created.
- **Boot support:**
 - UEFI+BIOS (recommended):** Bootable in UEFI and (Legacy) BIOS mode
 - BIOS:** Bootable only in (Legacy) BIOS mode. Only use this option when boot problems occur in systems with classic BIOS.
 - UEFI:** Bootable only on UEFI systems (incl. SecureBoot). Use this option when booting problems occur on UEFI systems.

none: No bootcode will be written onto the disk, as to not overwrite an

already existing bootcode. If the disk does not contain a bootcode, it will not be bootable upon connection. This option is designed for use with boot managers in order to not overwrite them.

- **Format disks (USB only):** Formats the selected drive prior to making it bootable, for instance should booting problems occur or in order to newly set up a USB disk. All data on the USB disk will be deleted.
- **HDClone/L:** Additionally transfers all files of the Linux-based self-booting variant of HDClone (▶ 3.3 HDClone/L) to the bootable media.

Click on Create now to start creating the bootable disk. Follow the instructions and wait for the program to confirm successful completion. Continue under ▶ 7 Program Startup or ▶ 5 Quickstart.



Note: When creating a CD/DVD, please always use a new, empty writeable CD/DVD. Otherwise there may be problems when trying to boot HDClone from this CD/DVD.

6.3 Windows PE

You may also create bootable CD versions of Windows Vista, Windows 7, Windows 8/8.1 or Windows 10. To do so, we recommend the freely available projects with the builder from CWCodes which you may find under <http://www.cwcodes.net/>.

You will find the projects for **Windows Vista PE**, **Windows 7 PE** and **Windows 8 PE**, **Windows 8.1 PE** and **Windows 10 PE** at the following URLs:

- **Windows Vista PE (VistaPE):** <http://vistape-capi.cwcodes.net/>
- **Windows 7 PE (Win7PE SE):** <http://w7pese.cwcodes.net/>
- **Windows 8 PE (Win8PE SE):** <http://w8pese.cwcodes.net/>
- **Windows 8.1 PE (Win8.1 SE):** <http://win81se.cwcodes.net/>
- **Windows 10 PE (Win10 SE):** <http://win10se.cwcodes.net/>

After having created a USB stick with Builder, copy `hdclone.exe` into the stick's root folder. If using a CD/DVD, select Finals ▶ Create ISO on the left hand side in builder prior to creating the ISO. The button Put Files for 'RootCD' Here will open a folder to which you can copy `hdclone.exe`, in order for it to be included with the ISO image to be created. When creating a 64 bit Windows PE (x64), use the `hdclone64.exe` file instead.



Hint: You may also include device drivers, especially for RAID's, with

Windows PE. This will make them accessible from HDClone. For this purpose, the desired drivers must already be installed on the system you are using. On the left hand side, select in Builder *Drivers* ▶ *Driver Integration*. Click on *Double Driver Export Host Drivers* to include the installed drivers with the Windows PE to be created.

6.3.1 Windows HotCopy

There is a practical alternative to creating a ▶ 6.3 Windows PE in order to obtain an independently bootable Windows; for example to use special Windows drivers for RAID or SCSI/SAS. Simply create a temporary clone of an existing Windows Installation. Install additional required drivers before or after creating the clone. This clone will then offer a Windows which can be booted independently from the installed operating system, similar to a Windows PE. Start HDClone/W from there.

6.4 ISO Image

The HDClone software package contains an ISO image (hdclone.iso):

- To be created with ▶ 6.2 Boot-Setup, option ISO image.
- In a program package in ZIP format as hdclone.iso.
- On the genuine media (CD/DVD or USB stick) as hdclone.iso.

It can be used to create a bootable HDClone CD/DVD in any operating system using third party CD/DVD writing software capable of burning ISO files. For further information, please refer to the manual of your CD/DVD writing software.

1. Start your CD/DVD writing software and choose **Create CD from image file** (or similar option, depending on the CD/DVD writing software used).
2. Specify the file `hdclone.iso` as an image file (instead of adding it as a normal file).
3. Insert a blank CD /DVD into the drive and start the burning process.

Once these steps have been completed, you will have created a bootable CD/DVD. You can use it to start (boot) HDClone directly on a PC with a bootable CD/DVD drive as described in ▶ 7 Program Startup.



Hint: The easiest way to create a bootable CD under Linux is to use the software tool `cdrecord` with the following syntax:
`cdrecord hdclone.iso`

7 Program Startup

7.1 Windows

Following the installation (▶ 6.1 Setup for Windows), you may start HDClone from the Windows Start Menu under Program ▶ HDClone 7... ▶ Start HDClone. Alternately HDClone can be started by invoking the file `hdclone.exe` either from the genuine HDClone media or directly from the software package (ZIP archive).



Note: HDClone/W comes as 32 and 64 bit application. The appropriate application for the Windows version used will be linked upon installation in the start menu. When invoking the program file directly for the 64 bit application, please use the file `hdclone64.exe`.

7.2 Self-booting

Connect the bootable USB stick or insert the bootable CD/DVD (▶ 6.2 Boot-Setup). Start the PC and ensure that BIOS will boot from the desired media. HDClone/S will then be launched from the bootable media. Click **L** on the home screen to start HDClone/L.



Note: Should your PC not boot from the HDClone boot media, press **F8**, **F11** or **F12** (BIOS dependent) as soon as you power on the PC to access the boot menu and select the boot media.

Symbi will also boot on UEFI systems, with or without SecureBoot mode.

7.3 Quit Program

In the lower right of the system bar you find a symbol to close the application (**C** under Windows) or to power off the PC (**⏻** self-booting). Click on the symbol to quit HDClone.


If a program function remains open, you can return to the main screen by clicking on the menu symbol **☰** in the lower left hand corner of the system bar or by pressing the **Esc** key. An actively running process will have to be finished or cancelled first.



Note: (Self-booting only) If you do not want to start HDClone when starting the computer next time, remember to first remove the HDClone boot media from the boot drive.

8 Inline Help

8.1 General

Detailed descriptions of all program functions and operating elements, as well as their modes of operation, can be found in the Inline Help, which can be invoked directly within the program. Open the Inline Help by selecting the question mark icon  on the left side of the system bar to the bottom or by pressing the **F1** key. In many cases, Help will already show a page with the current program context upon opening. Should there be no context available, Help's starting page will be displayed, allowing you to use either the table of contents or the search function to open the desired topic.

Generally, Help has the same contents for HDClone/W, HDClone/S and HDClone/L. Yet there are some minor differences in the Help display, which are described below.

8.2 Windows

If HDClone was installed by using [▶ 6.1 Setup for Windows](#), HDClone/W will use the Windows help system, this means Help will open in a separate window.

In this case, you may also open Help independently from the program under the HDClone entry in the Windows Start Menu ([▶ fig. 6](#)).

If HDClone/W is started without previous installation using the Setup for Windows, the integrated help system will be used, as described in [▶ 8.3 Self-booting](#). The Help window will then appear within the HDClone application window.

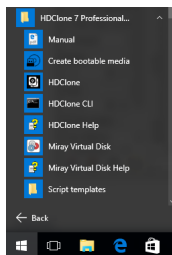


fig. 6: Windows Start Menu

8.3 Self-booting

The bootable version of HDClone also contains the Help in full. Here it will display in an integrated help system. This integrated help system is also used, if HDClone is used in Windows without installing it before.

9 Troubleshooting


This paragraph describes problems you may possibly encounter when using HDClone and offers proposals for solutions of these problems. Should you find no proposed solution to a problem, please feel free to contact our ▶ 11.4 Support.

9.1 General

Should a process not run as expected during the first attempt, a common, yet often effective solution is to give it a second try. This especially saves time when it comes to hardware, because a second attempt at connection or the use of another connector will oftentimes prevent problems from re-occurring.

9.2 System-Log

Should you encounter technical difficulties and turn to our ▶ 11.4 Support for assistance, we kindly ask that you create a system log, attach it, and send it with your request. Similar to a flight recorder, the system log will contain the processes within the program, which will help us – and therefore you – to find a solution in considerably less time.

System logs are saved under `Symbi-[date]-auto-[number].log` (▶ 9.2.1 Auto Log Function) or under `Symbi-[date]-[number].log` (▶ 9.2.2 Save Log Manually) together with the current date and a sequential number. HDClone/S and HDClone/L will file the system log in the path `\Symbi\Logs` on the USB stick. HDClone/W uses the (hidden) folder `C:\ProgramData\Miray\Logs`, which can be invoked directly via the Toolbox icon  and the menu item `Saved Log Files`.

9.2.1 Auto Log Function


HDClone saved system logs at certain points in time.



Important: If you have booted HDClone from a CD/DVD, the system log will not be automatically saved because no storage media will have been determined (see ▶ 11.2.2 Activation).

9.2.2 Save Log Manually

You may also trigger the system log to save yourself once a problem occurs, or if the system log does not save automatically, as described below:

1. **HDClone/S + HDClone/L:** If you have booted HDClone from a CD/DVD, connect a USB stick in order to save the System Log.
2. Click on the Toolbox symbol  and choose **Store System Log** or press **Ctrl + Alt + F12**.
HDClone/S + HDClone/L: If you have booted HDClone from a USB stick, the System Log will be stored to it automatically. Otherwise, a popup will open and prompt you to select a storage media.
3. The saving process will be displayed in a pop-up window. The system log will be saved in the folder and under the file name specified in chapter [▶ 9.2 System-Log](#).

9.3 Create a Bootable HDClone Media

This chapter addresses potential issues when creating a bootable media for the self-booting versions of HDClone (HDClone/S + HDClone/L).

9.3.1 USB Stick not Working

Should the creation or the booting of a bootable USB stick fail, it may not contain a partition table. In this case, use the **Format Media** option in [▶ 6.2 Boot-Setup](#) in order to recreate a bootable USB media. The files contained on the USB stick will be thereby lost.

9.3.2 CD/DVD Writer not Selectable

Should no drive be displayed during the boot setup under the CD/DVD burner, the installed burn software may be the cause. It may exclusively reserve the burner, so that it cannot be accessed by the boot setup. In this case, deactivate or uninstall the burner software, or create a bootable CD/DVD with your burn software and the [▶ 6.4 ISO Image](#) for HDClone.

9.4 Booting HDClone

Should issues arise while booting HDClone from a USB stick or CD/DVD (for example black screen or startup screen freezes), the following chapters provide appropriate solutions.

9.4.1 BIOS-USB-Boot

If the HDClone bootable media (USB stick or USB CD/DVD drive) is not listed in the BBS menu ([▶ 7.2 Self-booting](#)), activate USB boot support in the BIOS setup first. Press **F2**, **Del**, or **F10** (depending on BIOS) to enter BIOS setup. The

setting can be found under different names and menu items, depending on the BIOS version. In most cases, it can be found under labels such as **USB**, **Boot** and **Legacy**. In BIOS setup you can also opt to boot from USB permanently, usually under the menu item **Boot**.

9.4.2 UEFI-Boot and SecureBoot

Current PC models often have a UEFI-BIOS. HDClone supports booting with UEFI. Some PCs also offer the SecureBoot function, which HDClone also supports. Should you encounter problems with SecureBoot, deactivate this function prior to booting HDClone. You may reactivate **SecureBoot** again afterwards. If issues still occur while booting with UEFI, recreate the bootable media (▶ 6.2 Boot-Setup) while thereby deactivating the **UEFI Boot Support** option. Then repeat the booting process

9.4.3 Extended Boot Options

The boot settings of HDClone/S and HDClone/L are optimized for fast booting. If there are any problems with booting, change the settings on the boot screen (▶ fig. 7) press the **M** key for **More Options**. This will display the Extended Boot Options.

Start Selection

You may choose whether you wish to start HDClone/S or HDClone/L here.

- **Start Symbi**: Start the native system.
- **Start Symbi/L**: Start the Linux-based system.

Startup Mode

The startup mode offer the option to adjust various configurations for the system start in a graduated manner.

- **Normal**: Start the system with the most efficient configuration.
- **Compatible**: Conservative configurations with minimal limitations.
- **Safe**: Reduced configuration, limited device support.
- **Emergency**: Minimal configuration to save a ▶ 9.2 System-Log.

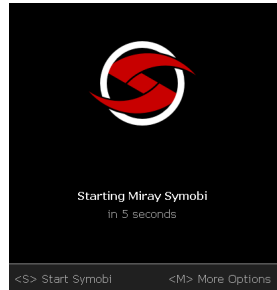


fig. 7: Boot screen

Graphics Mode

A certain graphics mode can be selected, should issues occur.

- **Auto:** Automatically determine a graphics mode.
- **Native:** Use UEFI graphics mode (only with UEFI BIOS).
- **VESA:** Use VESA mode via BIOS.
- **VGA BIOS:** Use VGA mode via BIOS.
- **VGA:** Initialize VGA mode natively.

System Log

Options to save the System Log.

- **Default:** Standard setting for all information.
- **Reduced:** Only with problems with system logs that are too large.
- **Autosave:** Save the System Log upon system start.

Startup Options

You may activate or deactivate the options individually and boot with one of the start modi afterwards.

- **USB:** Deactivate in order to prevent disturbances from devices that are connected to normal USB ports (connect input devices to USB 3 or PS/2!).
- **Advanced HID:** Advanced support for input devices. Deactivate if problems with the keyboard or mouse occur.
- **SATA port multiplier: extended detection:** Activate if disks that are connected with port multipliers are not recognized.

Select the desired start modi and options, and boot with the desired start selection afterwards (keys **↑**, **↓** and **Return**).

9.5 Input Devices

If there is no reaction on the mouse or keyboard input after starting HDClone/S, the following subchapters provide further information and solutions.

9.5.1 General

A generally very successful solution when having issues with input devices is to connect an alternative USB input device of the same type.

9.5.2 Bluetooth Devices

HDClone/S also supports Bluetooth mice and keyboards. If a Bluetooth input device is not recognized, please connect another USB device of the same type.

9.5.3 Problem Devices

A few input devices contain a flawed implementation of the standard. Though those devices may work with Windows, as vendors usually test them against Windows, they will not work with other operating systems. Should this be the case, please use a different USB device temporarily. Create a [▶ 9.2 System-Log](#) and submit it, together with information about the applicable vendor and model of the non-working device to our [▶ 11.4 Support](#).

9.6 Copied Disk

9.6.1 Clone not Booting

If the clone (or the restored image) of a bootable disk does not boot as expected, please review the following:

- Will the source boot successfully? If not, this is what causes the issue.
- Ensure that the automatic boot data adjustment is applied to the target after the copying process has been completed.
- Could the file system of the source be defective? Check on this prior to creating a copy by running `chkdsk /f` on the source. Errors on the source's file system may result in problems on the target, even if the source appears to boot and work correctly. Otherwise, use FullCopy or BitCopy.
- Is the disk connected to the target system in the same way as the source in the original system? Some versions of Windows refuse booting if a SATA port is configured as AHCI in the BIOS of the original system, and as IDE in the target system. If this is the case, change the BIOS setting accordingly.
- Usually, Windows is unable to boot from USB disks. If you have created a copy of a Windows system to USB, connect the disk as an internal drive before attempting to boot Windows from it.

9.6.2 Decelerated System

If the performance of the target disk is clearly decreased after cloning or restoring from an image, the drive may use 4K sectors internally. Create another copy or restore the disk once more while ensuring that the **4K alignment** option is selected for the target disk.

9.7 Copying Process

9.7.1 Read, Write and Verification Errors

When HDClone reports errors, it is usually the result of defective areas on the corresponding disk. General hardware problems can also cause reading and writing errors, which are usually indicated by a very high number of errors. In this event, cancel the copying process, connect the affected disk to another port, or check it for defects. Then restart the copying process.



Note: If disks are connected by USB, use another USB port and ensure sufficient power supply. When using USB cases for SATA or IDE hard disks, first check if the case is working properly.

9.7.2 Copying Performance

Should the copying performance of HDClone not achieve the expected value, please consider the following:

- Is the disk working without any issue? Please use the SpeedTest function to check if source and target achieve the expected speed, or which of them shows a lack of transfer speed.
- When using USB cases for SATA and IDE hard disks, please note that the maximum transfer speed is much lower for USB 2 than for SATA or IDE.
- When using USB3 devices, ensure that they are connected to a USB 3 connector (blue). While in fact USB3 devices are downward-compatible, yet they only run at USB2 speed when plugged to a USB2 connector (black).
- Also be advised that creating a SmartCopy or images will not achieve the nominal transfer speed of a FullCopy or BitCopy. This is a normal occurrence due to technical reasons.

9.8 Mass Storage

Please ensure that the disks are working properly and connected correctly and the power supply is sufficient. The following subchapters contain information about certain types of storage media.

9.8.1 SCSI/SAS

When using SCSI devices, they must be configured correctly and connected to one of the supported SCSI controllers.



Note: For SCSI and SAS disks, we recommend using HDClone/W or HDClone/L due to them offering a wider spectrum of support for SCSI and SAS controllers than HDClone/S.

In addition to the adapters listed under **▶ 14.4 SCSI and SAS**, HDClone/S also supports other SCSI controllers, either as Onboard-Chipset (AIC), or as adapter (AHA, ASC). They are determinable by the vendor ID and device ID, which are listed in the table below:

Vendor	Model	Device	Vendor	Model	Device
9004h	AHA-2930U	3860h	9004h	AHA-4944UW	8678h
9004h	AHA-2930CVAR	3868h	9004h	AIC-7887	8778h
9004h	AHA-2930CVAR	3869h	9004h	AIC-7888	8878h
9004h	AHA-4944(U)W	3B78h	9004h	AHA-4944(U)W	EC78h
9004h	AIC-755x	5x75h	9005h	AHA-2940/50U2W	0010h
9004h	AIC-785x	5x78h	9005h	AIC-789x	001xh
9004h	AIC-7560	6075h	9005h	AIC-789x	002xh
9004h	AIC-786x	6x78h	9005h	AIC-789x	003xh
9004h	AIC-7870	7078h	9005h	AHA-3940/50U2x	0050h
9004h	AHA-2940(W)	7178h	9005h	AHA-3950 U2x	0051h
9004h	AHA-3940(W)	7278h	9005h	AIC-7896/7 U2	005Fh
9004h	AHA-2944	7478h	9005h	AIC-789x	006xh
9004h	AHA-3944(W)	7578h	9005h	AIC-789x	007xh
9004h	AHA-4944(U)W	7678h	9005h	AIC-7892(A B)U160	008xh
9004h	AIC-7877	7778h	9005h	AIC-789x	009xh
9004h	AIC-7860	7860h	9005h	AIC-789x	00Axh
9004h	AIC-7895	7895h	9005h	AIC-789x	00Bxh
9004h	AIC-7880	8078h	9005h	AIC-7899(A) U160	00Cxh
9004h	AHA-2940U(W)	8178h	9005h	AIC-789x	00Dxh
9004h	AHA-3940U(W)(D)	8278h	9005h	AIC-789x	00Exh
9004h	AHA-2944UW	8478h	9005h	AIC-789x	00Fhx
9004h	AHA-3944U(WD)	8578h	9005h	AHA-2930U2	0180h

9.8.2 USB Hubs

USB devices can either be connected directly or over a USB hub. In order to achieve the highest transfer rates as possible, it is recommended that they be connected directly to the PC or the USB controller.



Note: USB 3 devices must be connected by a special USB 3 cable together with an appropriate USB connector (blue), and must be used, if applicable, with an external power supply in order to utilize the top speed of USB 3.

9.8.3 Thermal Issues

Some mass storage devices, especially very fast SSDs, are enabled by HDClone to reach high data transfer rates, which may lead to overheating problems. This usually results in frequent read or write errors on the respective device, due to the chip installed therein becoming unresponsive to commands. This may also occur with hardware bridges, for example with SATA-to-USB adapters and it usually occurs in cheaper devices.



Note: This type of response represents a hardware error due to current standards clearly stipulating that normal software commands cannot cause any damage to the hardware.

In order to prevent these types of issues, please use, if applicable, the program's speed limitation option. Depending on the setting, the copying process will then be slower than usual due to HDClone automatically adding small pauses to prevent the hardware from overheating.

9.9 Network

9.9.1 Mapped Network Drives

A small change in the Windows Registry is needed in order for HDClone/W to find established network drives. This is usually completed automatically by the **▶ 6.1 Setup for Windows**, yet you may also make this change manually as described below:

- Open the following key in the Registry Editor (**regedit.exe**)
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System
- Create the **DWORD** value **EnableLinkedConnections**
- Assign the date 1 to it and restart Windows

In order to reverse these changes, simply delete the created value.

9.9.2 Network Shares

Should network shares not be displayed, it may help to make the following changes in the Windows Registry when working with a Windows PC or Server:

- Set the **LargeSystemCache** value to 0 (zero) in key HKLM\System\CurrentControlSet\Control\SessionManager\MemoryManagement
- Set the **size** value to 3 in key HKLM\System\CurrentControlSet\Services\LanmanServer\Parameter.

10 Miray Virtual Disk

HDClone contains the **Miray Virtual Disk** software, which allows mounting file images created with HDClone – even VMDK, VHD/VHDX, VDI images – as virtual Windows drives. You can then access files and folders stored within a file image directly. **Miray Virtual Disk** can be started either on demand or automatically at the system start-up. File images may be mounted either only on demand or persistently.



Note: You can also open and mount file images as virtual drives directly from the network, using network drives or network shares.

10.1 Installation

Miray Virtual Disk is included in the ▶ **6.2 Boot-Setup**. You can choose to install **Miray Virtual Disk** during setup (▶ **6.1 Setup for Windows**). It will be installed to a separate location within the **Program Files** directory.

10.2 Program Startup

You will find **Miray Virtual Disk** in the Windows Start Menu within the HDClone folder. The program window will appear at the start-up. Since **Miray Virtual Disk** works in the background, the program icon will appear in the System Tray. **Miray Virtual Disk** will remain active in the background, even if the program window is closed. You can reopen the program window using the **System Tray** icon.

10.2.1 Inline Help

Miray Virtual Disk contains an inline help which can be opened from within the program by the context menu in SystemTray, or by pressing the **F1** key. Help for **Miray Virtual Disk** can also be opened apart from the program via the HDClone entry in the Windows Start Menu (▶ **8.2 Windows**).

11 Miscellaneous

11.1 Legal Information

11.1.1 GPL

Parts of this product are based on products which are licensed under the GNU General Public License (GPL). The applicable license can be found by visiting <http://www.gnu.org/copyleft/gpl.html>. To be sent a copy of the source code, submit your request to support@miray.de.

11.1.2 Disclaimer

While HDClone was programmed and tested with the greatest possible care, please understand that we cannot assume any liability for the proper functionality of the program, and that we cannot be held liable for any damages that may result from its usage, which may be subject to gross negligence or intent.

11.2 Licensing

Various types of licenses are offered with HDClone in order to accommodate diverse usage scenarios. The standard types of licenses encompass the most common, yet not all, application scenarios. Therefore, standard licenses can be extended if needed, or individual licenses can be converted. For inquiries, please contact us by phone +49 89/72013-643 or mail@miray.de.

11.2.1 Standard License Types

- **Workplace License:** Permanent installation on up to two PCs belonging to the licensee, typically PC and laptop.
- **Technician License:** Usable on random PCs with the associated USB token. Additional permanent installation on up to two PCs owned by the licensee.
- **Volume License:** Permanent use on a determined number of PCs, according to the selected licensing volume. May also be used to extend existing Workplace, Technician and Volume Licenses.
- **Maintenance License:** Usable on random PCs with the associated USB token. Extends existing Technician Licenses.

- **One-time License:** Contingent on individual start-ups of the software. May be used with random PCs. Also suitable for simultaneous usage and for remotely operated systems. Extends existing Technician Licenses.

We offer further licensing options per request, for example within local networks or as a Corporate or Site License.

11.2.2 Activation

Some license types require mandatory activation (Workplace License, Volume License, One-time License), while some activations are optional (Technician License). Activations are divided into Single Activation (SA) and Permanent Activation (PA). These are performed automatically upon installation or when starting the program. In the event that both activation types are available, the software will prompt you on which one to use (► fig. 8).

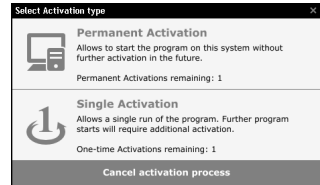




fig. 8: Boot screen

 **Important:** Workplace or Technician Licenses include a small contingent for SAs, yet this is intended for urgent situations only. Therefore, always use PAs or your USB token (Technician License) in cases of urgency.

A PA has only to be completed once per system. Afterwards, the program can be started without any further activation. When switching systems (for example migration), you can release an existing PA by uninstalling the software. Your activation may then be (re-)used on the new system.

 **Note:** When working with a Technician License, please ensure that the USB token is connected prior to the installation or the start of the program. The software will automatically recognize it and will not need to request it.

11.2.3 License Extension

We offer extensions for the following standard license types:

- **Workplace License:** The addition of further PAs and SAs.
- **Technician License:** The addition of USB-Tokens, PAs and SAs
- **Volume License:** The addition further PAs.

11.2.4 Customer-specific Licensing

Should you find that none of the above-listed standard license types and extensions meet your specific application scenario, we can also implement individual licensing models, including for use on license servers for easy license management within local networks.

11.3 Feedback

We are very interested in your feedback. We continuously strive to resolve any program errors that you may encounter, as well as to review and integrate, if at all possible, any ideas for improvement that you may have. If you wish to share your opinion of the software with us, we will be happy to hear from you!

Online miray-software.com/Feedback

Email feedback@miray.de

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11.4 Support

Should you encounter any questions or issues with any of our products, our support team will be glad to assist you. Please send us your inquiry via our homepage at miray-software.com/support or email us at support@miray.de. If you also encounter technical difficulties, please attach a ▶ 9.2 System-Log regarding the respective process.