



Syslogic White Paper

Guidelines for the creation of a correct image (data carrier image)

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1 Introduction

The data of a storage medium, such as a flash memory, can easily be saved in a file by using software. This is called an image or data carrier image.

1.1 Image (data carrier image) or simple data backup?

An image (data carrier image) is a one-to-one copy of one or more partitions of the storage medium used. The operating system, programs and data, including their position, are saved on a data carrier. If the image is copied from the data carrier to another storage medium, it results in an exact image, bit for bit identical to the original.

Unlike a simple data backup, where only the directories and files of a storage medium are copied, an image receives information about the file system structure of the original storage medium, including that of the boot sector MBR (master boot record). This is required so that a system can boot from the storage medium after the restoration of the image.

In addition, a simple data backup leads to problems if software is included that requires entries in the registry. With a simple data backup, the entries in the registry are lost, which leads to malfunctions.

1.2 Why is an image useful?

You can save yourself a great deal of frustration and anger by creating an image. If a storage medium like a flash memory is switched out, whether due to a defect with the loss of data or because you are switching to a memory with a greater capacity, an image offers the best possible convenience. The image can be duplicated as often as you wish from the data carrier to a new storage medium by using a suitable program (see point 3.1). Then the operating system can be used immediately without adaptation. Additional software, including configurations, that are installed on the original memory are available on the new storage media.

Compared to an image, the simple data backup has several disadvantages. When switching the memory, the entire operating system, including the drivers and additional software, has to be reinstalled. Only then can user data be recovered. If several memories are being replaced in parallel, this leads to a considerable amount of work. In addition, the manual recovery of a memory includes risks concerning system consistency. An error quickly creeps in, which can be ruled out during the transfer of an image.

1.3 Which storage media are suitable for industrial applications?

For its embedded box computer and touch panel computer, Syslogic only uses industrial flash memories, which are qualified according to the current industry standards. Different form factors, such as SD cards or compact flash are used. For applications that require fast writing and reading cycles, Syslogic uses CFast cards, which have a SATA-II interface.

For flash memories (SSD - solid state drive), Syslogic primarily uses memories from Cactus Technologies, one of the few companies that has committed itself entirely to the industrial market. The Cactus memories are among the most durable and rugged on the market. As a second source, Syslogic keeps the industrial line of Apacer at hand, which is qualitatively equal with the Cactus memories.

2.1 What is needed to create an image:

- Phillips screwdriver PH 1
- USB, CFast or Compact Flash Reader
order number "CPN/USB3-CFAST"
http://syslogic.com/deu/cfast-to-usb-converter_217692.shtml
- Microsoft Windows PC



2.2 Preparation

- Disconnect the embedded box computer / touch panel computer from the power supply.
- Unscrew the service cover.
- Open the securing clip.
- Remove the CFast or compact flash card.

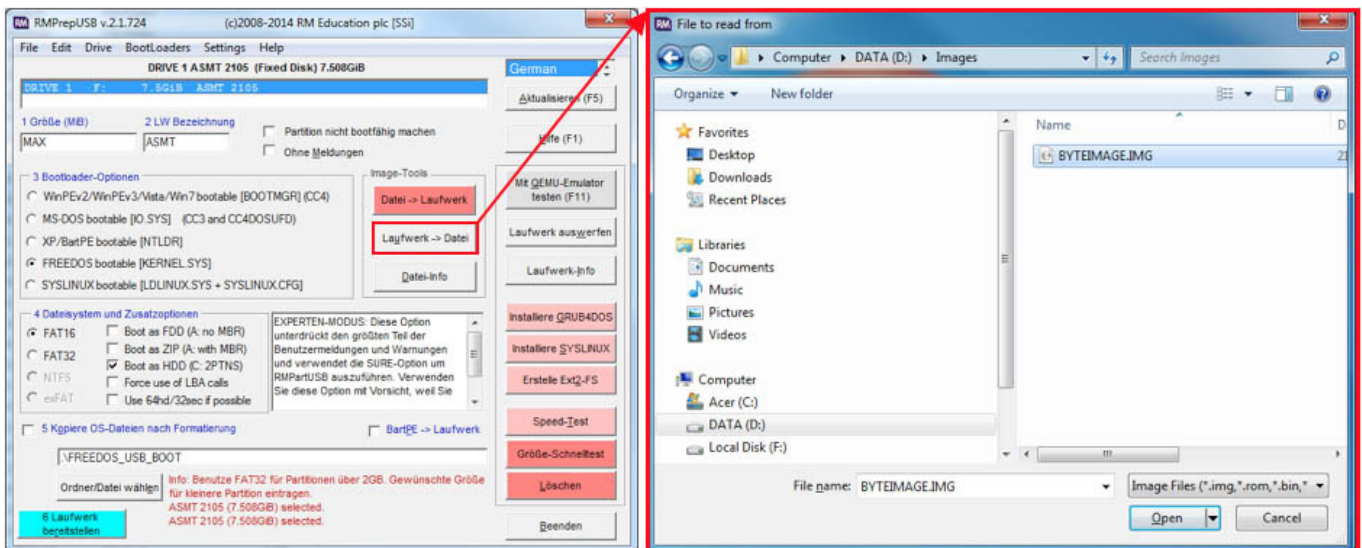


3.1 Software for the image creation: RMPrepUSB

The freely available software RMPrepUSB works well to create an image. Using a graphical interface, the connected storage medium can be selected and the drive is saved in a file.

3.2 Image creation

- Download and install the tool: <http://www.rmprepusb.com>
- Connect the flash memory with card reader to a Windows computer.
- Start the software and select the desired storage medium from the list.
- Select the "Drive >> File" button and navigate to the desired storage location.
- Define the file name and activate it with the "Open" button.
- The copying process is started as soon as all messages have been confirmed with OK. The memory requirements correspond to the capacity of the storage medium connected to the computer.
- The copying process takes a few minutes. If the message "Drivetofile completed OK" appears, then the image was successfully created.

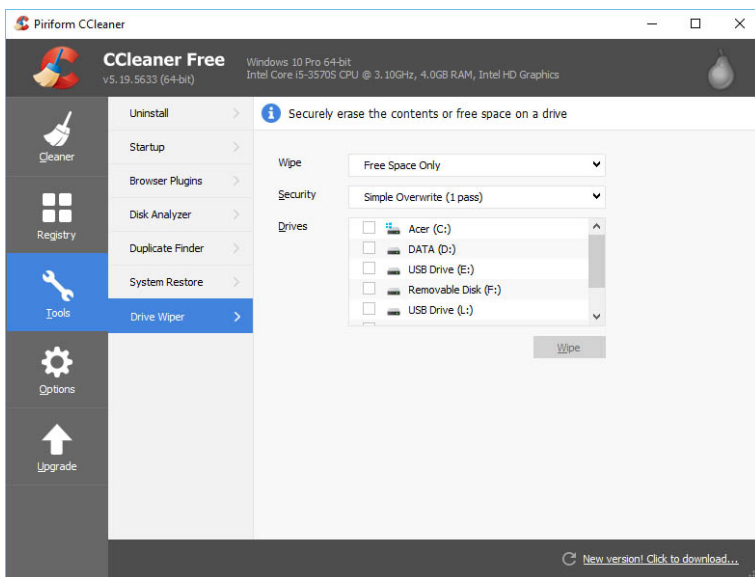


3.3 Optional step – how to deal with unnecessary data

A byte image is created with RMPrepUSB. It is recommended to completely overwrite the unused memory space on the flash memory card with zeros. Unnecessary data is removed in this way. Otherwise this data is copied when duplicating the image. By eliminating the unnecessary data, the image is leaner, which allows for a fast duplication. If the image is also compressed, the amount of data is reduced greatly.

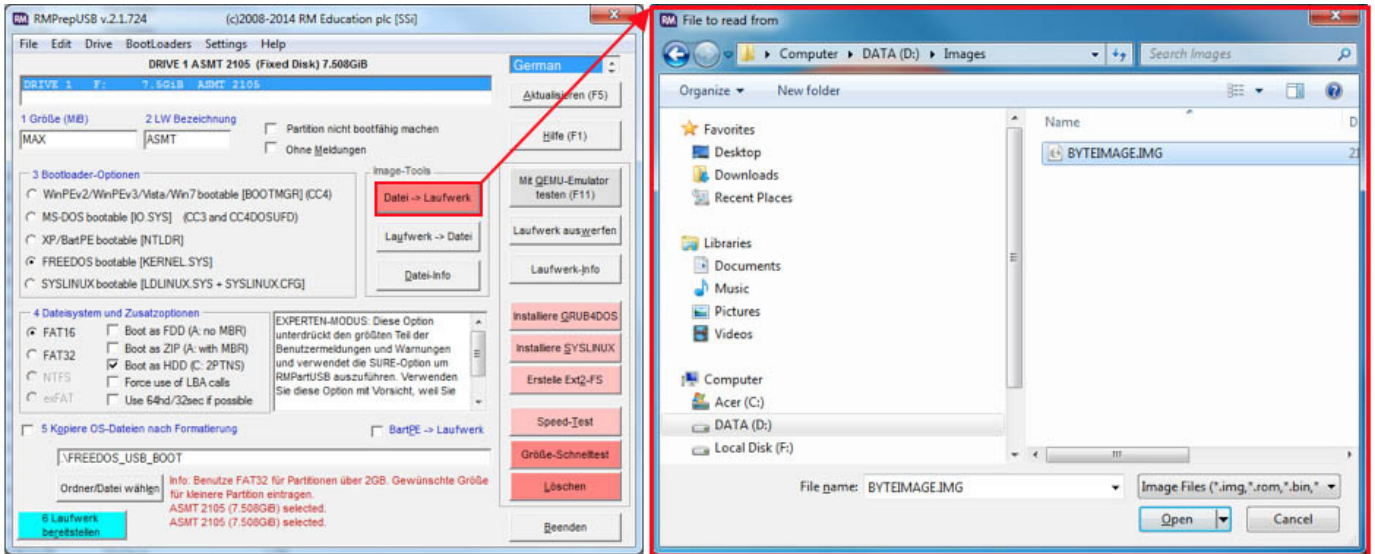
There are various tools available to eliminate unnecessary data. We will explain below how the tool CCleaner is used.

- Download and install the tool: <https://www.piriform.com/ccleaner/download>
- Switch to Tools and access „Drive Wiper“.
- Select the desired drive and start the process with „wipe“.
- The free space on the drive is erased. This will take some time to complete.



3.3 Restore image

- Connect the flash memory with card reader to a Windows computer.
- Select the storage medium in the list.
- Select the "File >> Drive" button and navigate to the storage location of the desired image.
- Open the file.
- The copying process is started as soon as all messages have been confirmed with OK.



4.1 Introduction

The tool dd that is widespread in the Unix world makes it possible to create a bit-exact data carrier image. dd comes standard on any Unix operating system and does not need to be installed.

4.2 Hardware requirements

External data carriers, such as USB stick or USB hard disk. (Capacity \geq CFast, Compact Flash)

4.3 Preparation

Connect the monitor, mouse, keyboard and power supply to the embedded box PC or touch panel PC.

5.1 Image creation

- Start the embedded box PC or touch panel PC and wait until the Debian interface appears.
- Connect an external storage medium, such as USB stick or USB hard disk.
- Start the console and enter "dmesg." All connected devices are shown. Search for sd*. The USB stick connected in the lower example has the designation sdc.

```
root@netipc:# dmesg
...
scsi 2:0:0:0: Direct-Access    TinyDisk 2007-02-16        0.00 PQ: 0 ANSI: 2
sd 2:0:0:0: [sd] 8060927 512-byte logical blocks: (4.12 GB/3.84 GiB)
sd 2:0:0:0: [sd] Write Protect is off
sd 2:0:0:0: [sd] Mode Sense: 00 00 00 00
sd 2:0:0:0: [sd] Asking for cache data failed
sd 2:0:0:0: [sd] Assuming drive cache: write through
sd 2:0:0:0: [sd] Asking for cache data failed
sd 2:0:0:0: [sd] Assuming drive cache: write through
sd 2:0:0:0: [sd] Attached SCSI removable disk
sd 2:0:0:0: [sd] Asking for cache data failed
sd 2:0:0:0: [sd] Assuming drive cache: write through
sd 2:0:0:0: [sd] Attached SCSI removable disk
...
```

- Mount the storage medium: The connected storage medium must be manually mounted. Run the following command. The designation /dev/sdc1 may vary.

```
root@netipc:# mount /dev/sdc1 /media/usb1/
```

- Start the back up with dd: The creation of the image starts with the following command. A one-to-one copy of the drive sda (operating system) is made to the USB stick that was just mounted. This process may take a few minutes.

```
root@netipc:# dd if=/dev/sda of=/media/usb1/name_des_image.img
```

5.2 Restore image

The image can be restored with the RMPrebUSB tool. A functioning Linux is required for the restoration in a Unix system.

Procedure

- Make the embedded box computer or touch panel computer available and start it. Wait until the Debian Linux is operational.
- Connect the destination drive with card reader or storage medium with image to the computer.
- With "dmesg," control which drives are connected to the embedded box computer or touch panel computer.
- Note the drive letter.
- Mount the storage medium with the image to /dev/usb1/. (The destination drive does not need to be mounted).

```
root@netipc:# mount /dev/sdx1 /media/usb1/
```

- The image can be restored with the following command.

```
root@netipc:# dd if=/media/usb1/name_des_image.img of=/dev/sdx
```

Achtung: Laufwerksbuchstabe kann variieren und muss angepasst werden!

- After completion, shut down the embedded box computer or touch panel computer. The destination drive can now be used.