

How to use a (usb) floppy drive to backup and restore double density (dd) and high density (hd) disk images using Linux for vintage roland synthesizers, samplers or music keyboards

Old vintage synthesizer keyboards, samplers and other musical devices often used 3.5" floppy disk drives in the late 80s and early 90s for storage of sounds, samples and midi data. Some devices used HD (high density) disks, some drives only supported DD (double density) disks. Therefore those disks may contain up to 1.44MB for a HD, and max 720KB for a DD floppy disk.

The way the data is stored or organized onto the floppy disk on a low level is called "geometry". There are several different geometries. but the most common two are those used by IBM/MSDOS are

- 3.5" 1.44MB HD Floppy Disk : track=80, head=2, sector=18, block=512
- 3.5" 720/730KB DD Floppy Disk : track=80, head=2, sector=9, block=512

For DOS and Windows there are or has been some neat tools to create floppy disk image files from physical disks and vice versa. Tools like SDISK and OMNIFLOP. For Linux however there is '**dd**' and separate tools for "low level formatting" floppy disks like **ufiformat**. While 'dd' is almost always already installed as part of every base linux installation, uiformat (for USB floppy drives) must be installed manually. see your software repositories and search for "floppy" or "disk".

```
apt search floppy
apt search disk
apt search uiformat
```

If you are using a USB floppy drive like i do, since modern PCs and Notebooks often don't even provide a port or pin header for a floppy drive anymore, you may use "uiformat". Install it as follows:

```
apt install uiformat
# type 'man uiformat' to see the manual
```



NOTE: Since USB Floppy Drives do not show up under /dev/ as classical /dev/fd0???? drives anymore, you might want to use **lsblk** to list all block devices on your system and look for a device with the size 1.4M or 720K . that will be most likely your USB floppy drive.

Since floppy disks require a "low level format" first, before adding any data to it, we need to do this first using uiformat. But therefore we need to determine or decide what type or what "density" of floppy disk we want to format. If you have only DD floppy disks available, there is no choice. those can only be formatted as 720KB track=80, head=2, sector=9, block=512 .

If you have HD floppy disks on the other hand (what is more likely to get these days, if ever), you "usually" want to format them as HD disks, that is 1.44MB track=80, head=2, sector=18, block=512 .

BUT... it is often possible to format and use HD disks with a DD format (720KB) IF you “cover up” or “close” the disk-Type hole/marker on the rear RIGHT SIDE of your floppy disk. Just put some good strip of Tesa Tape a.k.a. Scotch Tape over the hole, so that its covered from the top and the bottom of the floppy. **It may be necessary to even paint/fill the tape with a sharpie/edding to prevent light from shinging through, since some floppy drives do detect this hole/marker by light, not by mechanical measures.** Maybe use a piece of electrical insulation tape or something similar. but make sure its nice thin and flat, so it does not come off and jam your disk drives.

To format a 720K DD floppy drive i used this command line:

```
ufiformat -V -v -f 720 /dev/sdX
```

The command shown will also VERIFY that the disk surface and low level structure is still readable and fine.

After that lowlevel formating, we can now write back our disk image files to the disk itself, to use it in our beloved music gear, synthesizers or samplers, like my ROLAND W30 Music Workstation. You will need your disk Image Files, like your System Disk (FD or SCSI) or any other compatible image file you can often download from the interwebs. Then you can use the following command to write out the disk image to your physical 720K DD floppy drive:

```
dd if=/your/path/to/image/file/W30HDCD.0UT of=/dev/sdX
```

Where 'if=' defines the **input file** or input data which is your disk image you want put on a disk, and 'of=' defines the **output file**, which is your floppy drive device name. the name may vary, depending on what type of floppy drive you have and how your linux kernel is presenting the drive to you. but you get the idea.

The disk operation may take quiet some time! so stay patient.

BTW: For more Info on ROLAND W30, Disk Formats and much more resources, see...

- <http://www.milton.arachsys.com/nj71/index.php?menu=2&submenu=4&subsubmenu=2&page=5>

With all this shown here, you should be good to rip your own disk images, restore disk from image files, and have a shit-ton of fun with your new/old vintage music gear, your kurzweil K2000, your roland S50/S550 and what not...

if you feel i missed something important, or you have tips for improvements, please drop me an email.

C ya

— [Axel Werner](#) 2018-05-25 20:54

[linux](#), [cli](#), [floppy](#), [fd](#), [synthesizer](#), [roland](#), [w30](#), [w-30](#), [dd](#), [diskimage](#), [backup](#)

