

USB Digital Camera HOWTO

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1.2. Intent

This HOWTO is intended for the new Linux user who already has a camera with Universal Serial Bus (USB) mass storage capabilities or wants to buy one. If you were like me, someone gave you one for your birthday, and you just could not take it back without hurting some feelings. So, you get into your Linux documentation and make it work. There is nothing we can't do, and there are no dumb questions, only information we don't have yet.

1.3. Scope of Devices

This procedure works with the Linux kernel version 2.4.8, and I tested it with a Sony P-50 Cybershot with a 4 MB and 64 MB memory stick, and a USB smart card reader for an Olympus camera. I have read that the procedure will also work on kernel versions back to 2.2.19, but there are no guarantees. I know the procedure does not work on my old kernel version of 2.2.15.

The information in this document is how I solved my problems. There are other way to do this but it may require recompiling the kernel, which I did not want to do. This document should give you the necessary information to make USB mass storage active at boot time.

Also, Linux is an evolving technology, a hands on technology, and while this document may not give you the answers to your specific question, it should give you a place to start exploring for those answers. Plus the serendipity of discovering new thing along the way.

The following excerpt from the "gphoto2 README" might give you some insight to other cameras that will work with this procedure. I don't know who to give credit for this, as I could not find a name.) Check the "gphoto" link for updated information: <http://www.gphoto.org>

Then, there are cameras supporting the so-called USB Mass Storage protocol. This is a protocol that has been published and lets you access any storage device, be it a camera or a disk connected via USB to your computer. As there are already drivers for this protocol out there, you don't need an additional program like gphoto2.

As of now, the following cameras seem to support the USB Mass Storage protocol:

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- ◆ Casio QV [2x00,3x00,8000]
- ◆ Fuji FinePix S1 Pro, [1400,2400,4700]Zoom, 1300, 4500
- ◆ HP PhotoSmart 315, 618, 912
- ◆ Leica Digilux 4.3
- ◆ Konica KD300Z
- ◆ Kyocera Finecam s3
- ◆ Minolta Dimage 7
- ◆ Nikon Coolpix 995
- ◆ Olympus C-100, C-200Z, C-700, C-860L, C-2040, C-3020Z, C-3040Z, C-4040Zoom, D-510, E-10
- ◆ Pentax Optio 330
- ◆ Sony DSC-F505(V), DSC P5, DSC-F707

Again, those cameras cannot be accessed through gphoto2.

Other cameras support a protocol called PTP or USB Imaging Devices that has been developed by Kodak and other. gphoto2 does not support PTP yet, but [jPhoto](#) does. Here is a short list of cameras that use this protocol:

- ◆ Kodak DC-4800, DX-3215, DX-3500, DX-3600, DX-3700, DX-3900, MC3 and all the cameras that use Kodak Easy Share" system.
- ◆ Sony DSC-P5, DSC-F707 (both need user configuration of the camera)

These cameras won't be supported until gphoto2 implements PTP.

1.4. Reading Material

You are encouraged to read the following manuals and HOWTOs. The information in them is helpful.

1.4.1. Man Pages

- **lsmod**
 - **modprobe**
 - **mount**
 - **mv**
 - **su**
 - **fstab**
 - **mtab**
 - **dir**
 - **install**
 - **mknod**
 - **chown**
-

1.4.2. HOWTOs

- *Module-HOWTO*
- *Bash-Prog-Intro-HOWTO*
- *SCSI-2.4-HOWTO*
- *Hardware-HOWTO*

Most distros come with all the HOWTOs. If yours did not, they are available at: <http://www.tldp.org>.

1.4.3. Websites

- <http://www2.one-eyed-alien.net/~mdharm/Linux-usb/>
 - <http://www.Linux-usb.org/USB-guide/book1.html>
-

Chapter 2. Assumptions

My system is a Athlon 900 with a 40 gig hard drive. I have no SCSI or USB devices. My kernel was compiled without any of the SCSI or USB drivers. I compiled the SCSI and USB drivers as modules. I have version 2.4.8_26mdk of the Linux kernel with Mandrake 8.1. Since we are working on the kernel level, this document should be applicable to any distro.

I also make the following assumptions in this document:

- You do not have any SCSI or USB modules loaded or mounted.
 - You are the superuser and have the root password.
 - The word camera can refer to a device of type camera, card reader, any USB mass storage device.
 - The mount point "camera", /mnt/camera, does not refer to a device in the aforementioned context. Look in the directory /mnt and you will probably see cdrom, disk, floppy, and maybe several others device names. In mine, you will see these plus "camera". These are directories, and they are mount points.
 - The symbol "[bash]\$" means the command line prompt. Do not type it when you are entering a command. It is where you type the command line to give user input to the computer.
-

Chapter 3. Preliminary Setup

At this point you need to make some decisions. You will need to create a directory for a mount point, and you will need a name for this directory. I use `camera` and place it in `/mnt`. The name of the directory (`camera` in my case) can be any word of your choice. The command for creating this directory is:

```
[bash]$ mkdir -m 777 /mnt/camera
```

I prefer for all my pictures to be in one directory with subdirectories by subject matter, so I also created a directory named `picture`, and placed it in my home directory. The name of the directory (`picture` in my case) can be any word of your choice. The command for creating this directory is:

```
[bash]$ mkdir -m 777 ~/picture
```

See [Section A.1](#), listed at the end of this document.

The big decision! Are you going to do this as "user" or "superuser/root"?

Chapter 4. The Script Files

The following script file is the result of reading several of the Linux newsgroups and a lot of HOWTOs and manuals. I take no credit for originality but confess that this is a compilation of what those more experienced have told me. A very big thank you to all those in the newsgroups who responded to my questions and the ones posted by others who were seeking this information.

To get started, using your favorite text editor select a name for the file and, type in the following script for a user or superuser.

4.1. If You Login as User

Type in the following script file:

```
echo "Please enter a directory name for the pictures."
read DIRPATH
mkdir ~/picture/$DIRPATH
su -c "/sbin/modprobe usb-storage; mount -t vfat /dev/sda1 /mnt/camera;
/etc/rc.d/init.d/usb start;
mv /mnt/camera/dcim/100msdcf/*.jpg ~/picture/$DIRPATH;
umount /mnt/camera;
chown -R your_login_name ~/picture/$DIRPATH"
```

4.2. If You Login as Superuser

If you are not creating this script for use as superuser, go to [Section 4.3](#).

Type in the following script file.

```
echo "Please enter a directory name for the pictures."
read DIRPATH
mkdir picture/$DIRPATH
/sbin/modprobe usb-storage
mount -t vfat /dev/sda1 /mnt/camera
/etc/rc.d/init.d/usb start
mv /mnt/camera/dcim/100msdcf/*.jpg picture/$DIRPATH;
umount /mnt/camera
chown -R your_login_name picture/$DIRPATH
```

4.3. Make it Executable

Now make the script file executable. The command for that is:

As user:

```
[bash]$ su -c "chmod a=r+w+x your_script_file_name"
```

As superuser:

```
[bash#] chmod a=r+w+x your_script_file_name
```

4.4. What is Happening while the script is running

When you run the script, it will create a subject matter directory. DIRPATH should describe the pictures and is entered at the prompt. If `your_script_file_name = getcamJ`, (J for getting the pictures with .jpg extensions) the command sequence would look like this:

```
[bash]$ getcamJ
Please enter a directory name for the pictures.
bash)$ something
Password:
[bash]$ your root password
```

If you run this script file in superuser mode the rest of this paragraph does not apply. You have to be superuser to run this. Consequently, the 'su' command. The `-c` flag will let you execute one command and return to your present working directory. The quotation marks allow you to enter more than one command. And the semicolon allows one command to execute right after the last.

`/sbin/modprobe usb-storage: modprobe` will install the USB mass storage module along with any other modules or drivers needed. Mainly the SCSI driver. Make sure that you have in your `/dev` directory the following entries. `sda0, sda1, sda2, sda3, sda4, sdb0, sdb1, sdb2, sdb3, sdb4`. Set `sda1` to the appropriate device if you have other SCSI devices mounted, probably `sdb1`.

Mount your SCSI driver: `mount -t vfat /dev/sda1 /mnt/camera`

Start your USB: `/etc/rc.d/init.d/usb start`

Move your pictures from your camera to your hard drive. `mv` will also remove your pictures from your camera: `mv /mnt/camera/dcim/100msdcf/*.jpg picture/$DIRPATH;`

Unmount your SCSI driver: `umount /mnt/camera`

Then: `chown -R your_login_name picture/$DIRPATH`. When you do something as superuser (su) or root, root owns those files/pictures. Some of the things you may want to do to these files/pictures may give you a permission denied error. This allows the user to work without those errors. Read the manual for more information.

My system is set up with no USB or SCSI compiled into the kernel. All this was compiled as modules. This script file assumes your system is the same. If not, you will have to make some modifications. Please read the manuals and HOWTOs. Or ask on one of the Linux newsgroups.

Chapter 5. Exploring and Fine Tuning

OK, you should be set up and ready to do some exploring. Go take some trash pictures with your camera in all the different formats. Mine will take in 4 formats, TIFF, GIF, JPEG, and MPEG, and it also provides a thumbnail of each picture. In my Sony P-50 these will be stored on the memory media in 4 different sub-folders, 100msdcf, imcif100, thm, and moml0001. These are in 2 folders, dcim, and mssony. You need to find how your camera names the directories. You can do this in the following manner:

- Copy the above script file to a working file name.
- With your text editor change line: `mv /mnt/camera/dcim/100msdcf/*.jpg picture/$DIRPATH` to `mv /mnt/camera/* picture/$DIRPATH`
- Run the script from a command line as follows:

```
[bash]$ ./your_script_file_name
```

(notice the dot and forward slash)

5.1. DON'T PANIC

THE MODIFIED SCRIPT FILE MAY GIVE YOU SOME ERRORS. Just ignore them for now. Before you panic and say it does not work, look and see if you have pictures. If you do, write down the directory path names. Go back to your text editor and substitute them for `dcim/100msdcf/*.jpg` in the script file. You may want to make several script files to handle the each of the different picture formats.

At this point the directory on your hard drive should look something like [Section A.2](#). Enter this command to confirm it does:

```
[bash]$ dir -R name-of-your-picture-directory
```

The information in this document and the manuals and HOWTOs should get you up and running.

Good Luck.

Dave

Chapter 6. Troubleshooting or PANIC!

If nothing has gone right, let's do some troubleshooting. Use your camera and see if you still have pictures on it. If you do, skip the rest of this paragraph. If you don't, they should be someplace, check again. If not, and you can not find them, go take some more. Turn your camera off and plug it in and boot up again.

Check to see if the mount point unlinked by `mv, /mnt/camera` is there. If it's gone create it again. Sometimes the mount point disappears in modified mode. Also, I have notice on my system that sometimes the SCSI device in `/dev (sda1)` gets removed. Check that also and replace if needed.

Clean up all the extra directories you got from the script you ran that produced the errors and run your new script with the directories and see if it works. To make it easier to clean up all the directories and files you may have to `su` – if you're in user mode. Be sure to change back when you get through. See [Appendix C](#) at the end of this document.

Type:

```
[bash]$ dmesg
```

and you should see this somewhere:

```
hub.c: USB new device connect on bus1/1, assigned device number 2
usb.c: USB device 2 (vend/prod 0x54c/0x10) is not claimed by any active driver. (The
0x54c/0x10 will be different for different vendors.)
```

If you see this, your USB mass storage device in recognized.

Now turn your camera on and run the script file (the modified one) and you should see something like this when you run `dmesg` again:

```
[bash]$ dmesg

SCSI subsystem driver Revision: 1.00
Initializing USB Mass Storage driver...
usb.c: registered new driver usb-storage
scsi0 : SCSI emulation for USB Mass Storage devices
Vendor: Sony Model: Sony DSC Rev: 3.22
Type: Direct-Access ANSI SCSI revision: 02
WARNING: USB Mass Storage data integrity not assured
USB Mass Storage device found at 2
USB Mass Storage support registered.
Attached scsi removable disk sda at scsi0, channel 0, id 0, lun 0
SCSI device sda: 126848 512-byte hdwr sectors (65 MB)
sda: Write Protect is off
/dev/scsi/host0/bus0/target0/lun0: p1
usb-uhci.c: interrupt, status 3, frame# 1628
```

Now run this command and read [Appendix B](#).

```
[bash]$ lsmod
```

If the information from running `lsmod` appears as in [Appendix B](#), and your `dmesg` shows the information listed above, and there are no pictures, I don't know what is wrong. Unfortunately, the only thing I know to

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do is go thru the whole process again. Only this time use the re-direction option **>filename** to capture the results. Post this to one of these 2 newsgroups:

- alt.OS.Linux.mandrake
- comp.OS.Linux.hardware

telling what you've done and ask for help. Include everything you can think of, the more information the better, and e-mail me at the same time. My address is: daveekelly@earthlink.net.

Chapter 7. Last Things Last

After you have got everything working correctly and working just the way you want it to, this is something you can do if you want to. Not required. You can continue to run the executable script file from the directory you wrote it in with the dot slash option preceding the name (./) or you can install it in one of the directories that hold other executable applications. I would recommend `/usr/sbin`. The command for that is:

```
[bash]$ install file_name /usr/sbin
```

Appendix A. Appendix A

A.1. PART 1

This is the way I want my picture directory to be set up. A primary directory `picture` and a sub-directory describing the content `smkbot`.

```
picture/smkbot:  
dsc00117.jpg dsc00120.jpg dsc00123.jpg dsc00126.jpg dsc00129.jpg  
dsc00118.jpg dsc00121.jpg dsc00124.jpg dsc00127.jpg dsc00130.jpg  
dsc00119.jpg dsc00122.jpg dsc00125.jpg dsc00128.jpg dsc00131.jpg
```

A.2. PART 2

With the modified version of the script file you have the pictures scattered over several directories. But right now, this is what we want.

```
picture/trash:  
camera  
  
picture/trash/camera:  
dcim msony  
  
picture/trash/camera/dcim:  
100msdcf  
  
picture/trash/camera/dcim/100msdcf:  
dsc00357.jpg dsc00360.jpg dsc00363.jpg txt00365.gif  
dsc00358.jpg dsc00361.jpg dsc00364.jpg txt00365.thm  
dsc00359.jpg dsc00362.jpg dsc00366.jpg  
  
picture/trash/camera/msony:  
imcif100  
  
picture/trash/camera/msony/imcif100:  
dsc00364.jpg dsc00366.tif
```

Appendix B. Appendix B

What we want to see here is the word `usb-storage` under the `Used by` column:

```
Module      Size      Used by
nls_iso8859-12880  0  (autoclean)
nls_cp437  4400  0  (autoclean)
sd_mod11792  0  (autoclean)
vfat 9968  0  (autoclean)
fat 32192  0  (autoclean) [vfat]
usb-storage 52528  0
scsi_mod 91072  2 [sd_mod usb-storage]
ppp_deflate 42208  0  (autoclean)
bsd_comp  4576  0  (autoclean)
ppp_async 6672  0  (autoclean)
ppp_generic 19616  0  (autoclean) [ppp_deflate bsd_comp ppp_async]
slhc 5136  0  (autoclean) [ppp_generic]
parport_pc 20240  1  (autoclean)
lp 5808  0  (autoclean)
parport 24768  1  (autoclean) [parport_pc lp]
es1371 26768  1
soundcore 4208  4 [es1371]
ac97_codec 9312  0 [es1371]
gameport 1856  0 [es1371]
af_packet 12560  0 (autoclean)
ip_vs 62000  0 (autoclean)
usb-uhci 21232  0 (unused)
usbcore 50752  1 [usb-storage usb-uhci]
rtc 5600  0 (autoclean)
```

Appendix C. Appendix C

When you go to clean up all those test directories, use the following command. *BUT BE VERY VERY CAREFUL*:

```
[bash]$ rm -Rf picture/test_directory
```

You could lose more than you bargain for, `test_directory` should be what you entered for `$DIRPATH` in the scripts above. (It never hurts for first time user to slip over somewhere else and create a directory tree, copy file to it, and test this command line before using it on something irreplaceable.) Again read the manual.

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