

writing first patch

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21 july 2024

# linux kernel configuration

## ► drivers configuration options

1. Disabled: “n”
2. Built into the kernel (vmlinux image) to be loaded at boot time: “y”
3. Built as a module to be loaded as needed using `modprobe`: “m”

modules (**.ko**) files can be loaded when kernel detects hardware that matches the driver

- ▶ new releases often introduce new configuration variables or rename configuration symbols (in which case `make oldconfig` will not produce a working kernel)
- ▶ run `make listnewconfig` to see list of new configuration symbols

refer *this-doc* for `kconfig` and `make config`

and *this-doc* to learn about kernel build process

# writing patch

- ▶ add remote; so you can fetch changes and choose a tag to rebase from

```
1 git remote add linux git://git.kernel.org/pub/  
   scm/linux/kernel/git/torvalds/linux.git  
2 git fetch linux
```

- ▶ create new branch in `linux_mainline`

```
1 git checkout -b test_patch
```

## make change to a driver

- ▶ run `lsmod` to list modules loaded on your system and
- ▶ we will make a change to `uvcvideo` driver
- ▶ now you have to find `.c`, `.h` files; in linux kernel repository

searching Makefile can lead you there; `git grep` will get you there faster; since it ignores generated `.o`, `.ko`, ... files and `.git` folder

uvcvideo is a USB Video Class (UVC) media driver for video input devices, such as webcams. It supports webcams on laptops.

Let's check the source files for this driver.

```
1 ls drivers/media/usb/uvc/
```

Let's make a small change to the **probe function** of the uvcvideo driver. A probe function is called when the driver is loaded. Let's edit `uvc_driver.c`:

- ▶ find the `uvc\_probe` function; add `pr\_info("your message") ;` to it;
- ▶ A `pr_info()` function writes a message to the kernel log buffer, and we can see it using `dmesg`.

```
1 vim drivers/media/usb/uvc/uvc_driver.c
```

```
1 static int uvc_probe(struct usb_interface *  
    intf,  
2                     const struct  
                        usb_device_id *id)  
3 {  
4     struct usb_device *udev =  
        interface_to_usbdev(intf);  
5     ...  
6     int ret;  
7  
8     pr_info("I changed uvcvideo driver in  
        the Linux Kernel\n"); //Add this  
9  
10    if (id->idVendor && id->idProduct)  
11        ...  
12 }
```



- ▶ To make `uvcvideo` compiled as module; change `CONFIG_USB_VIDEO_CLASS=m`; in the Makefile
- ▶ Or you can built it into the kernel using “y” option

## time to test your change

Recompile your kernel and install. Then try unloading and loading the module and you should see your message

- ▶ Unload module
  - ▶ using: `sudo rmmod uvcvideo`
  - ▶ Check `dmesg` for any messages about the uvcvideo module removal.
  - ▶ Run `lsmod | grep uvcvideo`, Do you see the module?
- ▶ Load module:
  - ▶ using: `sudo modprobe uvcvideo`
  - ▶ Run `lsmod | grep uvcvideo`. Do you see the module?
  - ▶ Run `dmesg | less` and search for “your message”. Do you see the message?

```
[ 44.497979] systemd-journald[685]: /var/log/journal/4f68f95714c84ebc8d232ac71f8406bc/user-1000.jo
[ 44.826071] rfkill: input handler enabled
[ 46.272533] rfkill: input handler disabled
[ 81.028540] atkbd serio0: Unknown key pressed (translated set 2, code 0xab on isa0060/serio0).
[ 81.028546] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 81.141102] atkbd serio0: Unknown key released (translated set 2, code 0xab on isa0060/serio0).
[ 81.141110] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 82.392633] atkbd serio0: Unknown key pressed (translated set 2, code 0xab on isa0060/serio0).
[ 82.392638] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 82.527905] atkbd serio0: Unknown key released (translated set 2, code 0xab on isa0060/serio0).
[ 82.527911] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 227.787988] atkbd serio0: Unknown key pressed (translated set 2, code 0xab on isa0060/serio0).
[ 227.787994] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 227.892825] atkbd serio0: Unknown key released (translated set 2, code 0xab on isa0060/serio0).
[ 227.892831] atkbd serio0: Use 'setkeycodes e02b <keycode>' to make it known.
[ 548.694487] usbcore: deregistering interface driver uvcvideo
[ 596.156167] My first code in the linux kernel
[ 596.156799] usb 1-3: Found UVC 1.10 device HP Wide Vision HD Camera (0408:5425)
[ 596.490782] usbcore: registered new interface driver uvcvideo
[16:49]~ ❖
```

Figure 1: screenshot of dmesg; 3rd last line