

# 看门狗

配置内核中的硬件看门狗，使得一定时间内不喂狗就重启 Acadia 或 RPi 或 WRTnode，写一个程序或脚本保持一定频率的喂狗，当关闭这个程序或脚本时形成重启。实验报告要记录和表现出重启。

## 实现目的

1. 掌握看门狗的概念；
2. 掌握 Acadia 或 RPi 或 WRTnode 上编写看门狗程序的方法。

## 实验器材

### 硬件

- Acadia 或 RPi 或 WRTnode 板一块；
- 5V/1A 电源一个；
- microUSB 线一根；
- USB-TTL 串口线一根（FT232RL 芯片或 PL2303 芯片）。

以下为自备（可选）器材：

- PC（Windows/Mac OS/Linux）一台；
- 以太网线一根（可能还需要路由器等）。

### 软件

- PC 上的 USB-TTL 串口线配套的驱动程序；
- PC 上的串口终端软件，如 minicom、picocom、putty 等；
- PC 上的 SSH 软件，如 putty 等。

## 实验步骤

1. 编写看门狗程序并编译；

加载模块

```
pi@raspberrypi: ~
GNU nano 2.2.6      File: /etc/modules      Modified

# /etc/modules: kernel modules to load at boot time.
#
# This file contains the names of kernel modules that should be loaded
# at boot time, one per line. Lines beginning with "#" are ignored.
# Parameters can be specified after the module name.

snd-bcm2835
bcm2708_wdog
```

[ Read 7 lines ]

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos  
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell

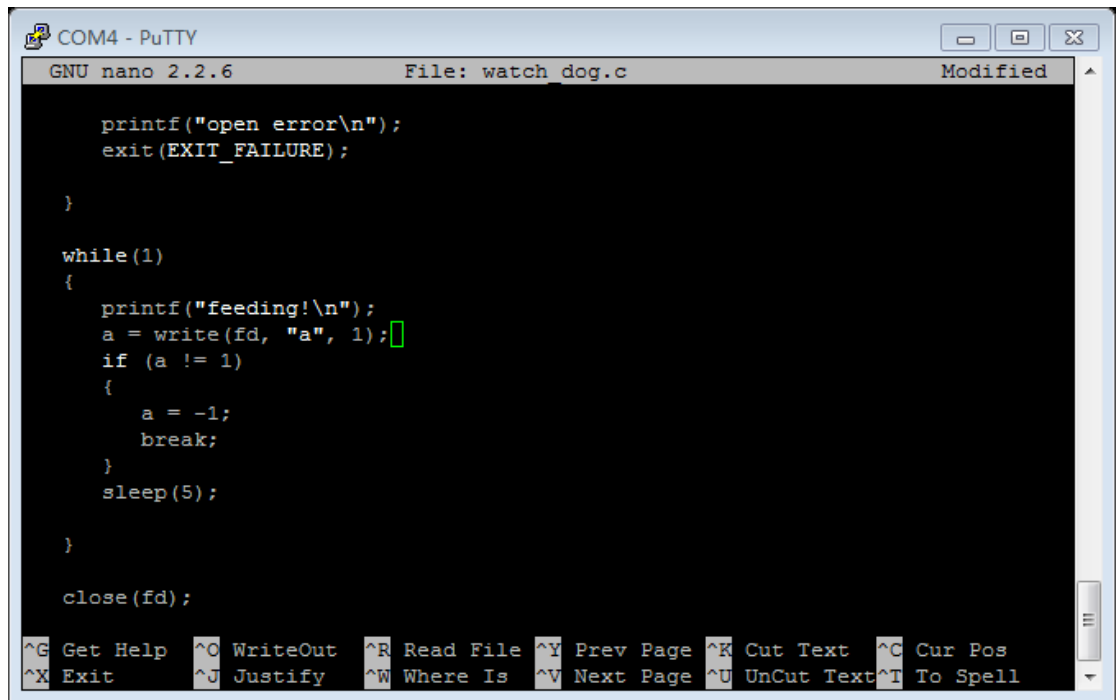
```
pi@raspberrypi: ~

--force-modversion      implies --force-modversions and
--force-vermagic         --force-vermagic
--force-modversion      Ignore module's version
--force-vermagic        Ignore module's version magic

Query Options:
  -D, --show-depends      Only print module dependencies and exit
  -c, --showconfig        Print out known configuration and exit
  -C, --show-config       Same as --showconfig
  --show-modversions      Dump module symbol version and exit
  --dump-modversions      Same as --show-modversions

General Options:
  -n, --dry-run           Do not execute operations, just print out
  -n, --show              Same as --dry-run
  -C, --config=FILE       Use FILE instead of default search paths
  -d, --dirname=DIR       Use DIR as filesystem root for /lib/modules
  -S, --set-version=VERSION Use VERSION instead of `uname -r`
  -s, --syslog            print to syslog, not stderr
  -q, --quiet            disable messages
  -v, --verbose          enables more messages
  -V, --version          show version
  -h, --help            show this help

pi@raspberrypi ~ $ sudo modprobe watch_dog
FATAL: Module watch_dog not found.
pi@raspberrypi ~ $ sudo modprobe bcm2708_wdog
pi@raspberrypi ~ $ sudo nano /etc/modules
pi@raspberrypi ~ $
```



```
COM4 - PuTTY
GNU nano 2.2.6      File: watch_dog.c      Modified

printf("open error\n");
exit(EXIT_FAILURE);

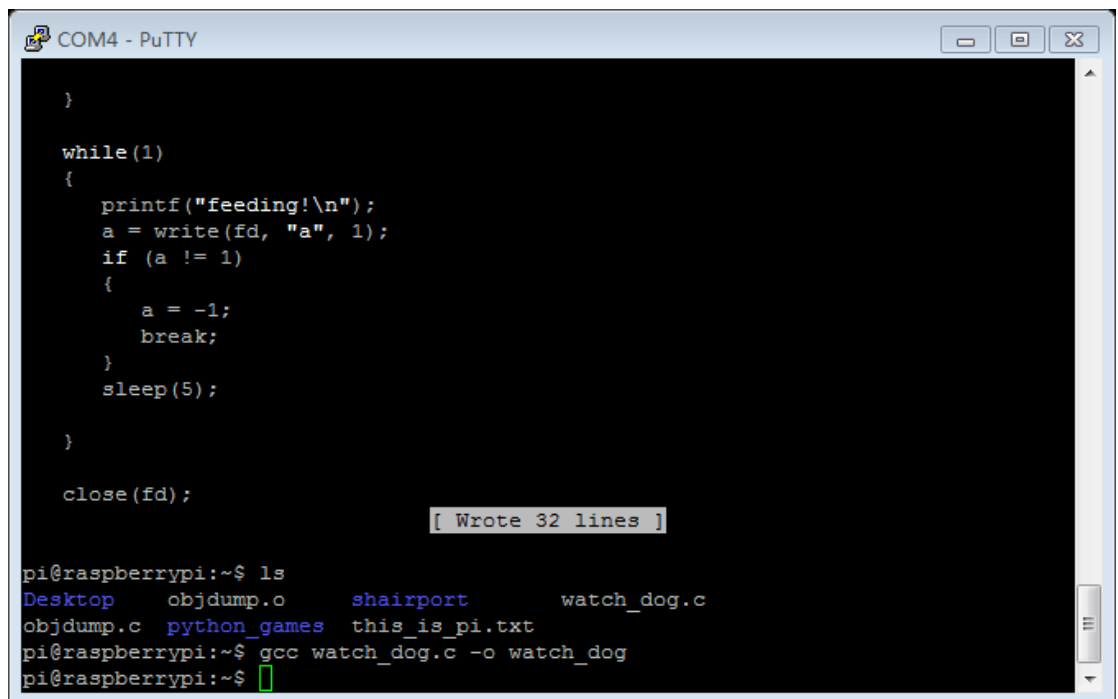
}

while(1)
{
    printf("feeding!\n");
    a = write(fd, "a", 1);
    if (a != 1)
    {
        a = -1;
        break;
    }
    sleep(5);
}

close(fd);

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

2. 运行程序;



```
COM4 - PuTTY

}

while(1)
{
    printf("feeding!\n");
    a = write(fd, "a", 1);
    if (a != 1)
    {
        a = -1;
        break;
    }
    sleep(5);
}

close(fd);

[ Wrote 32 lines ]

pi@raspberrypi:~$ ls
Desktop  objdump.o  shairport  watch_dog.c
objdump.c  python_games  this_is_pi.txt
pi@raspberrypi:~$ gcc watch_dog.c -o watch_dog
pi@raspberrypi:~$
```

3. 对程序进行验证。

```
COM4 - PuTTY

[ "watchdog" is a device file ]

pi@raspberrypi:/dev$ cd /home/pi
pi@raspberrypi:~$ ls
Desktop  objdump.o  shairport  watch_dog
objdump.c  python_games  this_is_pi.txt  watch_dog.c
pi@raspberrypi:~$ sudo root
sudo: root: command not found
pi@raspberrypi:~$ sudo su
root@raspberrypi:/home/pi# ./watch_dog
feeding!
feeding!

feeding!
feeding!
█
```

```
COM4 - PuTTY

[ "watchdog" is a device file ]

pi@raspberrypi:/dev$ cd /home/pi
pi@raspberrypi:~$ ls
Desktop  objdump.o  shairport  watch_dog
objdump.c  python_games  this_is_pi.txt  watch_dog.c
pi@raspberrypi:~$ sudo root
sudo: root: command not found
pi@raspberrypi:~$ sudo su
root@raspberrypi:/home/pi# ./watch_dog
feeding!
feeding!

feeding!
feeding!
feeding!
feeding!
^Z
[1]+  Stopped                  ./watch_dog
root@raspberrypi:/home/pi# Uncompressing Linux... done, booting the kernel.
[ 0.000000] Booting Linux on physical CPU 0x0
[ 0.000000] Initializing cgroup subsys cpu
[ 0.000000] Initializing cgroup subsys cpuacct
[ 0.000000] Linux version 3.18.7+ (dc4@dc4-XPS13-9333) (gcc version 4.8.3 20140303 (prerelease) (crossstool-NG linaro-1.13.1+bzr2650 - Linaro GCC 2014.03) ) #755 PREEMPT Thu Feb 12 17:14:31 GMT 2015
[ 0.000000] CPU: ARMv6-compatible processor [410fb767] revision 7 (ARMv7), cr=00c5387d
[ 0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT nonaliasing instruction cache
```

5 秒钟左右后自动重新启动。