

任务 23：看门狗

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资料：

什么是看门狗程序？

看门狗程序就是一个健康监控程序，每间隔一定时间（默认 10 秒）检查一次是否在设定的健康工作范围内，如果超过即启动硬件复位程序，让设备重新启动，恢复健康。

树莓派支持硬件自动复位？

是的，开源的 BCM2708 芯片让树莓派拥有了硬件看门狗芯片功能，加上 linux 内核编译好了的 bcm2708_wdog 模块，树莓派通过 watchdog 程序实现硬件看门狗功能，达到自动复位功能。

看门狗能做什么？

比如 CPU 占用过高假死一定时间，系统严重报错无法响应，CPU 温度过高...各种状态均可。

实验步骤

1. 编写看门狗程序并编译；

程序：



```
COM3 - PuTTY
GNU nano 2.2.6      File: watchdog.sh      Modified
#!/usr/bin/env bash

echo "[+] Activating Temperature Sensor"
modprobe bcm2708_wdog
echo "bcm2708_wdog" >> /etc/modules

echo "[+]Installing Watchdog"
apt-get -y install watchdog chkconfig

echo "[+]Setting Up Watchdog"
chkconfig watchdog on
sed -i 's/#max-load-1[^\ ]*/max-load-1\ /g' /etc/watchdog.conf
sed -i 's/#\ (watchdog-device\t[^\ ]*\)\ \=\ /1\t\ \=/g' /etc/watchdog.conf
sed -i 's/#\ (temperature-device[^\ ]*\)\ \=\ /1\ \ \=\ \/sys\/class\/thermal\/thermal\$ /g' /etc/watchdog.conf
sed -i 's/#\ (max-temperature[^\ ]*\)\ \=\ 120\/1\ \ \=\ 75000/g' /etc/watchdog.conf
sed -i 's/#\ (interval[^\ ]*\)\ \=\ 1\/1\ \ \=\ 10 /g' /etc/watchdog.conf
/etc/init.d/watchdog start
```

```
#!/usr/bin/env bash

echo "[+] Activating Temperature Sensor"
modprobe bcm2708_wdog
echo "bcm2708_wdog" >> /etc/modules

echo "[+]Installing Watchdog"
apt-get -y install watchdog chkconfig

echo "[+]Setting Up Watchdog"
chkconfig watchdog on
sed -i 's/#max-load-1[~5]/max-load-1\ /g' /etc/watchdog.conf
sed -i 's/#\ (watchdog-device\t[\ ]*\)\ \=/\1\t\=/g' /etc/watchdog.conf
sed -i 's/#\ (temperature-device[\ ]*\)\ \=/\1\ \=
\/sys\/class\/thermal\/thermal\_zone0\/temp/g' /etc/watchdog.conf
sed -i 's/#\ (max-temperature[\ ]*\)\ \=\ 120\/\1\ \=\ 75000/g'
/etc/watchdog.conf
sed -i 's/#\ (interval[\ ]*\)\ \=\ 1\/\1\ \=\ 10 /g' /etc/watchdog.conf
/etc/init.d/watchdog start
```

程序解释：

去掉 `watchdog-device = /dev/watchdog` 前的#号，让看门狗设备对应树莓派的硬件看门狗。

去掉 `max-load-1 = 24` 前的#号，当 1 分钟 load 进程超过 24 个的时候就会重启

还可以设置高温复位：

去掉 `temperature-device = max-temperature = 120` 前的#号，改为

`temperature-device = /sys/class/thermal/thermal_zone0/temp`
`max-temperature = 80000` 温度超过 80 度就会引起重启，保护 CPU。

还可以设置内存耗尽就重启，如 `min-memory = 1` 前的注释#号去掉

还可以设置监控的间隔，如 `interval = 1` 前的注释#号去掉，该 1 为任意数字，单位是秒，默认是 10 秒一次健康检查

2. 运行程序；

命令: `sudo sh watchdog.sh`

```
root@Acadia:~# sudo sh watchdog.sh
[+] Activating Temperature Sensor
FATAL: Module bcm2708_wdog not found.
[+] Installing Watchdog
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  chkconfig watchdog
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 76.9 kB of archives.
After this operation, 267 kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  chkconfig watchdog
Authentication warning overridden.
Get:1 http://ports.ubuntu.com/ubuntu-ports/ precise/universe chkconfig all 11.0-79.1-2 [9222 B]
Get:2 http://ports.ubuntu.com/ubuntu-ports/ precise/universe watchdog armhf 5.11
```

```
[+] Setting up watchdog
* Stopping watchdog keepalive daemon...
* Starting watchdog daemon...
```

3. 对程序进行验证。

运行下面程序让内核崩溃:

```
:(){:|:& }::
```

运行这一串字符会让系统内核立马崩溃, 测试一下死机后会不会重启, 就可以测试出看门狗程序是否正常工作。

输入程序, 观察 10 秒 (默认 10 秒) 后系统是否自动重启:

```
root@Acadia:~# :(){:|:& }::
```

从下图看出 Acadia 意外重启, 说明看门狗正常工作:

```
root@Acadia:~# :(){:|:& }::
[3] 4219
root@Acadia:~# Out of memory: Kill process 2817 (mysqld) score 37 or sacrifice c
hild
Killed process 2817 (mysqld) total-vm:315620kB, anon-rss:28368kB, file-rss:472kB
imx2-wdt imx2-wdt.0: Unexpected close: Expect reboot!
```

重启成功:

```
Last login: Thu Jan  1 08:08:35 CST 1970 on tty1
* Stopping watchdog keepalive daemon...
imx2-wdt imx2-wdt.0: Unexpected close: Expect reboot!
Welcome to Linaro 12.11 (GNU/Linux 3.0.35-2666-gbdde708 armv7l)

* Documentation:  https://wiki.linaro.org/
root@Acadia:~# [ OK ]
* Starting watchdog daemon... [ OK ]
* Starting web server apache2 [ OK ]
init: plymouth-stop pre-start process (3203) terminated with status 1
init: tty1 main process (3204) killed by TERM signal

root@Acadia:~#
root@Acadia:~#
root@Acadia:~#
```