# Rockchip Developer Guide Linux WDT

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**Preface**

**Overview**

When the count value of WDT is reduced to 0, a reset signal is generated to reset the system to prevent the system from being stuck due to software.

**Product Version**

| Chipset | Kernel Version |
| --- | --- |
| ALL | Kernel4.4& 4.19 |

**Intended Audience**

This document (this guide) is mainly intended for:

Technical support engineers
Software development engineers

**Revision History**

| Version | Author | Date | Change Description |
| --- | --- | --- | --- |
| V1.0.0 | Simon.Xue | 2019-12-23 | Initial version |
| V1.1.0 | Simon.Xue | 2021-04-13 | Add RK356X stop counting function |

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# 1. WDT Driver

The driver file is in:
`drivers/watchdog/dw_wdt.c`

## 1.1 DTS Node Configuration

The reference document  for DTS configuration is `Documentation/devicetree/bindings/watchdog/dw_wdt.txt`， this document mainly introduces the follow parameter :

- `interrupts = <GIC_SPI 120 IRQ_TYPE_LEVEL_HIGH 0>;`

The interrupt mode is to trigger an interrupt first, and then generate a reset signal after a timeout period.

- `clocks = <&cru PCLK_WDT>;`

This attribute function is to drive WDT to work, and calculate each counting cycle.

# 2. WDT Usage

The application operates the `/dev/watchdog` node to control the watchdog. Examples are as follows:

```
int main(void)
{
    int fd = open("/dev/watchdog", O_WRONLY);    //here through open to start
watchdog
    int ret = 0;
    if (fd == -1) {
        perror("watchdog");
        exit(EXIT_FAILURE);
    }
    while (1) {
        ret = write(fd, "\0", 1);     //Feed dogs by write
        if (ret != 1) {
            ret = -1;
            break;
        }
        sleep(10);
    }
    close(fd);
    return ret;
}
```

About `close()`

1. Under normal condition, executing `close ()`, which no longer feeding the dog and watchdog restart automatically .

`echo A > /dev/watchdog`, where any characters other than character V are written

2. `write (fd," V ", 1);` Then `close ()`, write uppercase V, the kernel continues to feed the dog, the system will not automatically restart.

`echo V > /dev/watchdog`

3. Configure the macro `CONFIG_WATCHDOG_NOWAYOUT`, repeat step 2, the kernel will not continue to feed the dog, and the system will be restarted.

# 3. Kernel Configuration

```
Symbol: WATCHDOG [=y]
Type  : boolean
Prompt: Watchdog Timer Support
    Location:
(1) -> Device Drivers
    Defined at drivers/watchdog/Kconfig:6
```

# 4. FAQ

## 4.1 WDT Can't Stop

The legacy version of WDT does not have a matched register to configure the stop function, which can only be stopped by disable clock or soft reset. The clock or reset operation of some Rockchip' s  product can only be performed in a safe environment. The new version of WDT adds a stop function in the future.

## 4.2 WDT Accuracy

The accuracy of WDT is only 16 levels, and the counting of adjacent level is quite different, so it cannot be counted finely.

```
0000: 0x0000ffff
0001: 0x0001ffff
0010: 0x0003ffff
0011: 0x0007ffff
0100: 0x000fffff
0101: 0x001fffff
0110: 0x003fffff
0111: 0x007fffff
1000: 0x00ffffff
1001: 0x01ffffff
1010: 0x03ffffff
1011: 0x07ffffff
1100: 0x0fffffff
1101: 0x1fffffff
1110: 0x3fffffff
```

```
1111: 0x7fffffff
```

Assuming that the wdt clock is 100MHz, the maximum timeout time is `0x7fffffff/100MHz = 21` seconds. If a larger timeout is required, the corresponding WDT clock needs to be adjusted.

## 4.3 PAUSE COUNTING

RK356X add pause counting function, use io command that from Rockchip or busybox's devmem to test pause counting and resume counting.

enable

```
CONFIG_DEVMEM
```

disable

```
CONFIG_STRICT_DEVMEM
```

Address 0xfdc60504 belongs to the register GRF_SOC_CON1 of SYS_GRF. write 0x1 to bit4 pause counting, write 0x0 to bit4 resume counting. Higher 16 bits are writable mask bits.

pause counting.

```
io -4 0xfdc60504 0x00100010
```

or

```
busybox devmem 0xfdc60504 32 0x00100010
```

resume counting.

```
io -4 0xfdc60504 0x00100000
```

or

```
busybox devmem 0xfdc60504 32 0x00100000
```