HCrtos watchdog timer userguide 2023.02.01

简介：watchdog timer 有两种模式：

1. **watchdog 模式，超时或达到计数值会产生复位中断；**watchdog 模式提供自动喂狗功能，需要在配置中打开。

2. **timer 模式，超时或达到计数值会超时 timer 中断；**

默认为 watchdog 模式，可通过 ioctl 进行配置不同模式。**watchdog timer 当前最大计时为 5,090,331,608us。**

！！！在自动喂狗模式下，串口 console 会提供 start 和 stop watchdog 两个命令，注意，在开启自动喂狗模式下，用 jtag 进行 debug 时，需要先停止 watchdog，不然在 os 被停止状态下，不会进行喂狗，watchdog 会超时，从而导致芯片复位！！！

看门狗模式

在 sdk 根路径下输入：make menuconfig，根据下面路径选中 watchdog 模式。

```c
There is no help available for this option.│
  │ Symbol: CONFIG_WDT_MODE_WATCHDOG [=y]│
  │ Type  : bool│
  │ Prompt: watchdog mode│
  │   Location:│
  │     -> Components│
  │       -> kernel (BR2_PACKAGE_KERNEL [=y])│
  │         -> Drivers│
  │           -> watchdog (CONFIG_DRV_WDT [=y])│
  │             -> watchdog timer running mode (<choice> [=y])│
  │   Defined at watchdog:5│
  │   Depends on: <choice>
    ---------------------------------------------------------------------

                        --- watchdog
                        -*-   enable watchdog driver
                              watchdog timer running mode (watchdog mode)  --->
                        [*]   auto feed watchdog timer in idle task
                        (3000) default timeout (in millisecond) of watchdog timer
```

输入：make kernel-rebuild all，编译选中的驱动。

自动喂狗

在 sdk 根路径下输入：make menuconfig，根据下面路径选中 auto feed watchdog timer in idle task。

```c
There is no help available for this option.│
  │ Symbol: CONFIG_WDT_AUTO_FEED [=y]│
  │ Type  : bool│
  │ Prompt: auto feed watchdog timer in idle task│
  │   Location:│
  │     -> Components│
  │       -> kernel (BR2_PACKAGE_KERNEL [=y])│
  │         -> Drivers│
  │           -> watchdog (CONFIG_DRV_WDT [=y])│
  │   Defined at watchdog:12│
  │   Depends on: BR2_PACKAGE_KERNEL [=y] && CONFIG_DRV_WDT [=y] && CONFIG_WDT_MODE_WATCHDOG [=y]

    ---------------------------------------------------------------------

                        --- watchdog
                        -*-   enable watchdog driver
                              watchdog timer running mode (watchdog mode)  --->
```

```
                           [*]   auto feed watchdog timer in idle task
                         (3000) default timeout (in millisecond) of watchdog timer
```

times(millisecond) of watchdog timer：该时间可选范围为 1-10000 毫秒，默认为 3000 毫秒，超过时间还未进行喂狗，则芯片会进行复位。

编译指令：make kernel-rebuild all

串口控制台命令

```c
hc1600a@dbC3000v10(wdt)# help

Commands available:
  help               Show available cmds
  exit               Exit from current cmd set
  history            Show history cmds
  start              start watchdog
  stop               stop watchdog
hc1600a@dbC3000v10(wdt)#
```

timer 模式

在 sdk 根路径下输入：make menuconfig，根据下面路径选中 timer mode。

```c
There is no help available for this option.│
  │ Symbol: CONFIG_WDT_MODE_TIMER [=y]│
  │ Type  : bool│
  │ Prompt: timer mode│
  │   Location:│
  │     -> Components│
  │       -> kernel (BR2_PACKAGE_KERNEL [=y])│
  │         -> Drivers│
  │           -> watchdog (CONFIG_DRV_WDT [=y])│
  │             -> watchdog timer running mode (<choice> [=y])│
  │   Defined at watchdog:8│
  │   Depends on: <choice>
   --------------------------------------------------------------------------

                        --- watchdog
                        -*-   enable watchdog driver
                              watchdog timer running mode (timer mode)  --->
                        [*]   auto feed watchdog timer in idle task
                        (3000) default timeout (in millisecond) of watchdog timer
```

编译指令：make kernel-rebuild all；timer 模式可以通过 ioctl 命令进行配置。

应用层使用

通过 ioctl，用不同的命令对 watchdog timer 进行操作。

开启 watchdog timer

```c
ioctl(fd, WDIOC_START, 0);
```

关闭 watchdog timer

```c
ioctl(fd, WDIOC_STOP, 0);
```

重置 watchdog timer 计数器的值为设置的值

```c
ioctl(fd, WDIOC_KEEPALIVE, 0);
```

设置 watchdog timer 模式，有 WDT_MODE_TIMER 和 WDT_MODE_WATCHDOG 两个可选。

```C
ioctl(fd, WDIOC_SETMODE, WDT_MODE_WATCHDOG);   //设置为watchdog模式

ioctl(fd, WDIOC_SETMODE, WDT_MODE_TIMER);      //设置为timer模式
```

设置 watchdog timer 的定时值，以 us 为单位

```C
uint32_t watchdog_timeout = 1000000; //us
ioctl(fd, WDIOC_SETTIMEOUT, (uint32_t)watchdog_timeout)
```

获取 watchdog timer 的定时值以 us 为单位

```C
uint32_t watchdog_timeout;
ioctl(fd, WDIOC_GETTIMEOUT, (uint32_t)&watchdog_status);
```

获取 watchdog timer 的剩余时间，以 us 为单位

```C
uint32_t watchdog_timeout;
ioctl(fd, WDIOC_GETTIMELEFT, (uint32_t)&watchdog_status);
```

示例程序

参考程序路径：components/cmds/source/watchdog/watchdog_test.c

示例程序编译

输入 make menuconfig，根据下面路径勾选示例程序：

```C
There is no help available for this option.
  | Symbol: CONFIG_CMDS_WATCHDOG_TEST [=y]
  | Type  : bool
  | Prompt: watchdog test operations
  |   Location:
  |     -> Components
  |       -> Cmds (BR2_PACKAGE_CMDS [=y])
  |   Defined at source:75
  |   Depends on: BR2_PACKAGE_CMDS [=y]
```

编译命令：make cmds-rebuild all

用法

在串口终端输入：watchdog_test

```C
hc1600a@dbC3000v10# watchdog_test
57 set watchdog timer timeout = 400000
62 get watchdog timer timeout = 400000
67 set watchdog timer mode to timer
72 start watchdog timer
notify_watchdog_call:27:receive watchdog timer notify
notify_watchdog_call:27:receive watchdog timer notify
notify_watchdog_call:27:receive watchdog timer notify
79 get watchdog timer residual value = 198868
84 get watchdog timer residual value = 194338
89 stop watchdog timer
94 reset watchdog timer timerout value
101 get watchdog timer residual value = 400000
hc1600a@dbC3000v10#
```