

# Watchdog on Linux/Ubuntu

## Background

Watchdog timers are commonly found in embedded systems and other computer-controlled equipment where humans cannot easily access the equipment or would be unable to react to faults in a timely manner. In such systems, the computer cannot depend on a human to reboot it if it hangs; it must be self-reliant.

Odroid C2 support watchdog driver **gxbb\_wdt** to control the PMU.

## Test Watchdog module

Watchdog driver gxbb\_wdt is configurable for Odroid C2.

You should be able to see `/dev/watchdog` and `/dev/watchdog0` device files being created.

```
odroid@odroid64:~$ ls -la /dev/watchdog*
crw----- 1 root root 10, 130 Feb 11 11:28 /dev/watchdog
crw----- 1 root root 248,   Feb 11 11:28 /dev/watchdog0
odroid@odroid64:~$
```

Watchdog daemon will trigger and reboot if we access the device file manually.

```
root@odroid64:~# echo 3 > /dev/watchdog
[ 186.570231] watchdog watchdog0: watchdog did not stop!
root@odroid64:~#
```

To manually stop watchdog to reboot.

```
# echo V > /dev/watchdog
```

## Install Watchdog daemon

To install watchdog daemon

```
sudo apt-get install watchdog
```

Create dir for watchdog logs files

```
sudo mkdir -p /var/log/watchdog
```

Append the default watchdog configuration. **/etc/default/watchdog**

```
# Start watchdog at boot time? 0 or 1
run_watchdog=1
# Start wd_keepalive after stopping watchdog? 0 or 1
run_wd_keepalive=1
# Load module before starting watchdog
watchdog_module=gxbb_wdt
# Specify additional watchdog options here (see manpage).
watchdog_options="-s -v -c /etc/watchdog.conf"
```

## Watchdog demon configuration files

You need to edit the **/etc/watchdog.conf** file to un-comment and so actually use the **/dev/watchdog** device access to the module. Otherwise the watchdog will not use the hardware and rely only on its internal code to soft-reboot a broken machine.

This configuration example sets the WDT timeout at 15 seconds. If you need a faster reboot, reduce the value of "watchdog-timeout".

```
$ cat /etc/watchdog.conf
#ping = 172.31.14.1
#ping = 172.26.1.255
#interface = eth0
#file = /var/log/messages
#change = 1407

# Uncomment to enable test. Setting one of these values to '0' disables it.
# These values will hopefully never reboot your machine during normal use
# (if your machine is really hung, the loadavg will go much higher than 25)
#max-load-1 = 24
#max-load-5 = 18
#max-load-15 = 12

# Note that this is the number of pages!
# To get the real size, check how large the pagesize is on your machine.
#min-memory = 1

#repair-binary = /usr/sbin/repair
#repair-timeout =
#test-binary =
#test-timeout =

watchdog-device = /dev/watchdog

# Defaults compiled into the binary
#temperature-device =
#max-temperature = 120
```

```
# Defaults compiled into the binary
admin                = root
interval             = 1
logtick              = 1
log-dir              = /var/log/watchdog

# This greatly decreases the chance that watchdog won't be scheduled before
# your machine is really loaded
realtime              = yes
priority              = 1

# Check if rsyslogd is still running by enabling the following line
pidfile              = /var/run/rsyslogd.pid

watchdog-timeout     = 15
```

**Note :** **watchdog-timeout** will generally determine after which watchdog failed to keep-alive, then it will trigger reboot.

For more configuration please follow link below.

<http://www.sat.dundee.ac.uk/psc/watchdog/watchdog-configure.html>

## Start Watchdog Service and Verify

### on Ubuntu 14.04.x enable watchdog service status

In order to start watchdog service we need to append /etc/rc.local

```
service watchdog restart
```

### on Ubuntu 16.04.x enable watchdog service status

In order to start watchdog service we need to create soft links of service as below.

```
sudo ln -s /lib/systemd/system/watchdog.service /etc/systemd/system/multi-
user.target.wants/watchdog.service
```

```
sudo systemctl enable watchdog.service
sudo systemctl start watchdog.service
```

Check for watchdog service is running successfully.

```
root@odroid64:~#
odroid@odroid64:~$ service watchdog status
● watchdog.service - watchdog daemon
   Loaded: loaded (/lib/systemd/system/watchdog.service; static; vendor
  preset:
   Active: active (running) since Wed 2016-06-22 01:52:23 EDT; 10s ago
```

```
Process: 1384 ExecStopPost=/bin/sh -c [ $run_wd_keepalive != 1 ] || false
(cod
Process: 1959 ExecStart=/bin/sh -c [ $run_watchdog != 1 ] || exec
/usr/sbin/wa
Process: 1955 ExecStartPre=/bin/sh -c [ -z "${watchdog_module}" ] || [
"${watc
Main PID: 1961 (watchdog)
CGroup: /system.slice/watchdog.service
└─1961 /usr/sbin/watchdog -s -v -c /etc/watchdog.conf

Jun 22 01:52:30 odroid64 watchdog[1961]: still alive after 6 interval(s)
Jun 22 01:52:30 odroid64 watchdog[1961]: was able to ping process 483
(/var/run/
Jun 22 01:52:31 odroid64 watchdog[1961]: still alive after 7 interval(s)
Jun 22 01:52:31 odroid64 watchdog[1961]: was able to ping process 483
(/var/run/
Jun 22 01:52:32 odroid64 watchdog[1961]: still alive after 8 interval(s)
Jun 22 01:52:32 odroid64 watchdog[1961]: was able to ping process 483
(/var/run/
Jun 22 01:52:33 odroid64 watchdog[1961]: still alive after 9 interval(s)
Jun 22 01:52:33 odroid64 watchdog[1961]: was able to ping process 483
(/var/run/
Jun 22 01:52:34 odroid64 watchdog[1961]: still alive after 10 interval(s)
Jun 22 01:52:34 odroid64 watchdog[1961]: was able to ping process 483
(/var/run/
lines 1-20/20 (END)
```

Once the watchdog demon is configured it tries to continuously reset the watchdog timer. When/if it fails to do it (because of unresponsive system), the timer will expire and the board will reboot.

Another way to test watchdog device is killing the watchdog demon after it has started.

```
root@odroid64:~#
root@odroid64:~# pkill -9 watchdog
```

## Test Watchdog daemon

To test watchdog daemon.

Be careful when using these commands.

The commands below will cause the kernel to crash.

Use caution when following these steps, and by no means use them on a production machine.

```
echo c > /proc/sysrq-trigger
```

This will force the Linux kernel to crash. If the watchdog works properly, it will reboot the system after 15 seconds.

```
root@odroid64:~# echo c > /proc/sysrq-trigger
[ 133.451497] SysRq : Trigger a crash
[ 133.451542] Unable to handle kernel NULL pointer dereference at virtual
address 00000000
[ 133.457380] pgd = fffffffc04cdae000
[ 133.460742] [00000000] *pgd=00000000056721003, *pmd=00000000000000000
[ 133.466956] Internal error: Oops: 96000046 [#1] PREEMPT SMP
[ 133.472474] Modules linked in: fuse ir_lirc_codec ir_mce_kbd_decoder
ir_sanyo_decoder ir_sony_decoder ir_jvc_decoder ir_nec_decoder
ir_rc6_decoder lirc_dev ir_rc5_decoder meson_ir zram lz4_decompress
lz4_compress meson_gpiomem gxbb_wdt ipv6 autofs4
[ 133.494298] CPU: PID: 1356 Comm: bash Not tainted 3.14.79-115 #1
[ 133.500419] task: fffffffc073b9ec80 ti: fffffffc050b9000 task.ti:
fffffffc050b9000
[ 133.507846] PC is at sysrq_handle_crash+0x24/0x30
[ 133.512495] LR is at __handle_sysrq+0x130/0x198
[ 133.516978] pc : [<fffffffc00142d144>] lr : [<fffffffc00142dcb0>] pstate:
800001c5
[ 133.524308] sp : fffffffc050b93d90
[ 133.527586] x29: fffffffc050b93d90 x28: fffffffc050b90000
[ 133.532847] x27: fffffffc001c94000 x26: 00000000000000040
[ 133.538108] x25: 00000000000000000 x24: 00000000000000004
[ 133.543370] x23: 00000000000000140 x22: fffffffc001e53000
[ 133.548631] x21: fffffffc001ce7b88 x20: 00000000000000063
[ 133.553892] x19: fffffffc001ca7000 x18: 00000000000000001
[ 133.559153] x17: 00000007f93ec63d0 x16: fffffffc0011e6638
[ 133.564415] x15: 00000000000080000 x14: 0000000000000033c
[ 133.569676] x13: 0000000000000033c x12: 00000000000072b14
[ 133.574937] x11: 00000000000000000 x10: 00000000000000000
[ 133.580198] x9 : 0000000000000033c x8 : 00000000000000002
[ 133.585460] x7 : 00000000000000001 x6 : 0000000000000033c
[ 133.590721] x5 : 00000000000000000 x4 : 00000000000000000
[ 133.595982] x3 : 00000000000000000 x2 : fffffffc0741974d0
[ 133.601243] x1 : 00000000000000000 x0 : 00000000000000001
[ 133.606506]
[ 133.606506] PC: 0xffffffc00142d0c4:
[ 133.611420] d0c4 91202000 94118ba6 b9402296 f9400a81 aa1303e0 2945dc34
94118615 b94032a0
[ 133.619528] d0e4 6b00029f 540000c0 aa1303e0 94118644 aa1503e0 97fffe50
17ffffe3 b94036a0
[ 133.627635] d104 0b1602f6 6b0002df 54ffff01 aa1503e0 97fffe17 17fffff5
00000000 a9bf7bfd
[ 133.635743] d124 910003fd aa1e03e0 d503201f d0004981 52800020 b904f020
d5033e9f d2800001
[ 133.643850] d144 39000020 a8c17bfd d65f03c0 a9bd7bfd 910003fd a90153f3
a9025bf5 2a0003f3
```

```
[ 133.651958] d164 aa1e03e0 aa0103f6 aa0203f5 d0005134 d503201f 9101c280
94118a63 5100c264
[ 133.660065] d184 7100249f 54000248 d00045c3 2a0403e1 911ea062 f864d842
eb0202bf 540002c1
[ 133.668173] d1a4 911ea063 52800013 f821d876 aa0003e1 9101c280 94118b6a
2a1303e0 a94153f3
[ 133.676281]
[ 133.676281] LR: 0xffffffffc00142dc30:
[ 133.681197] dc30 11000400 eb02007f 54ffffa1 6b04001f 54000640 910006b5
f10092bf 54fffe01
[ 133.689304] dc50 f00036e0 912d4000 94116821 b9019278 14000014 d503201f
51015e80 d00045c2
[ 133.697412] dc70 911ea041 f860d835 b4ffffbd5 340000b9 f00042e0 91280001
39680000 34000260
[ 133.705519] dc90 f9400aa1 f00038a0 9106a000 94116810 b9019278 2a1403e0
f94002a1 d63f0020
[ 133.713627] dcb0 aa1703e1 9101c2c0 941188aa f94023f9 a94153f3 a9425bf5
a94363f7 a8c57bfd
[ 133.721734] dcd0 d65f03c0 d503201f b9400420 7100041f 54ffffd80 b9401aa1
6a01001f 54ffffd21
[ 133.729842] dcf0 f0003520 9126a000 941167f9 17ffffed 52800000 17ffffce
f9400461 aa1903e0
[ 133.737949] dd10 941167f3 17ffffcc a9be7bfd 910003fd f9000bf3 2a0003f3
aa1e03e0 d503201f
[ 133.746057]
[ 133.746057] SP: 0xffffffffc050b93d10:
[ 133.750973] 3d10 00000063 00000000 01ce7b88 fffffffc0 01e53000 fffffffc0
00000140 00000000
[ 133.759080] 3d30 00000004 00000000 00000000 00000000 00000040 00000000
01c94000 fffffffc0
[ 133.767188] 3d50 50b90000 fffffffc0 50b93d90 fffffffc0 0142dcb0 fffffffc0
50b93d90 fffffffc0
[ 133.775295] 3d70 0142d144 fffffffc0 800001c5 00000000 01c899b8 fffffffc0
00000030 00000000
[ 133.783403] 3d90 50b93da0 fffffffc0 0142dcb0 fffffffc0 50b93df0 fffffffc0
0142e154 fffffffc0
[ 133.791510] 3db0 00000002 00000000 004fc408 00000000 004fc408 00000000
00000002 00000000
[ 133.799618] 3dd0 50b93ec8 fffffffc0 00000015 00000000 00000117 00000000
011e5c70 fffffffc0
[ 133.807725] 3df0 50b93e10 fffffffc0 01252954 fffffffc0 582bc100 fffffffc0
4cd9ca00 fffffffc0
[ 133.815834]
[ 133.815834] X2: 0xffffffffc074197450:
[ 133.820749] 7450 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 133.828857] 7470 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 133.836964] 7490 00000000 00000000 00000000 00000000 00000000 00000000
00000000
```

```

00000000 00000000
[ 133.845072] 74b0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 133.853179] 74d0 74195af8 ffffffff0 00000000 00000000 00000001 00000000
741974e8 ffffffff0
[ 133.861287] 74f0 741974e8 ffffffff0 00000000 00000000 00000000 00000000
00000000 00000000
[ 133.869394] 7510 00000000 00000000 00000000 00000001 00000000 00000000
00000000 00000000
[ 133.877502] 7530 74197530 ffffffff0 74197530 ffffffff0 00000000 00000000
00003409 00000000
[ 133.885613]
[ 133.885613] X16: 0xffffffff0011e65b8:
[ 133.890612] 65b8 aa0003f3 540003a0 910103a3 f9403a84 aa1503e1 aa1603e2
aa1403e0 f81f8c64
[ 133.898719] 65d8 97fffcce aa0003f5 b7f80060 f9401fa0 f9003a80 370800f3
37000133 aa1503e0
[ 133.906827] 65f8 a94153f3 a9425bf5 a8c47bfd d65f03c0 91012280 941aa0fd
3607ff33 aa1403e0
[ 133.914934] 6618 940005dc aa1503e0 a94153f3 a9425bf5 a8c47bfd d65f03c0
92800115 17ffffff0
[ 133.923042] 6638 a9bc7bfd 910003fd a90153f3 a9025bf5 aa0003f3 aa1e03e0
aa0103f5 aa0203f6
[ 133.931149] 6658 d503201f 2a1303e0 94007d5a f27ef414 aa0003f3 540003a0
910103a3 f9403a84
[ 133.939257] 6678 aa1503e1 aa1603e2 aa1403e0 f81f8c64 97fffd08 aa0003f5
b7f80060 f9401fa0
[ 133.947364] 6698 f9003a80 370800f3 37000133 aa1503e0 a94153f3 a9425bf5
a8c47bfd d65f03c0
[ 133.955473]
[ 133.955473] X19: 0xffffffff001ca6f80:
[ 133.960474] 6f80 fffffffe0 0000000f 01ca6f88 ffffffff0 01ca6f88 ffffffff0
01102a68 ffffffff0
[ 133.968582] 6fa0 fffffffe0 0000000f 01ca6fa8 ffffffff0 01ca6fa8 ffffffff0
01102958 ffffffff0
[ 133.976689] 6fc0 01f7b100 ffffffff0 01f7b700 ffffffff0 00000064 00000000
01103008 ffffffff0
[ 133.984797] 6fe0 01102dc0 ffffffff0 00000000 00000000 00000000 00000000
00000000 00000000
[ 133.992904] 7000 01ca7010 ffffffff0 00000000 00000000 01ca7048 ffffffff0
01ca7028 ffffffff0
[ 134.001012] 7020 00000000 00000000 01aa4dc8 ffffffff0 00000124 00000000
01102e18 ffffffff0
[ 134.009119] 7040 00000000 00000000 01aa4de0 ffffffff0 00000124 00000000
01102f30 ffffffff0
[ 134.017227] 7060 00000000 00000000 01103140 ffffffff0 01aa4df8 ffffffff0
01aa4e08 ffffffff0
[ 134.025335]
[ 134.025335] X21: 0xffffffff001ce7b08:
[ 134.030337] 7b08 0142d360 ffffffff0 01ad4c00 ffffffff0 01ad4c10 ffffffff0
00000020 00000000

```

```
[ 134.038444 ] 7b28 0142d3c8 ffffffff0 01ad4c28 ffffffff0 01ad4c40 ffffffff0
00000000 00000000
[ 134.046552 ] 7b48 0142d380 ffffffff0 01ad4c78 ffffffff0 01ad4c80 ffffffff0
00000010 00000000
[ 134.054659 ] 7b68 0142d6e8 ffffffff0 01ad4c90 ffffffff0 01ad4ca0 ffffffff0
00000080 00000000
[ 134.062767 ] 7b88 0142d120 ffffffff0 01ad4cb0 ffffffff0 01ad4cc0 ffffffff0
00000008 00000000
[ 134.070874 ] 7ba8 0142d3a0 ffffffff0 01ad4cd0 ffffffff0 01ad4ce0 ffffffff0
00000004 00000000
[ 134.078982 ] 7bc8 0142d490 ffffffff0 01ad4d08 ffffffff0 01ad4d10 ffffffff0
00000004 00000000
[ 134.087089 ] 7be8 0142d2b8 ffffffff0 01ad4d18 ffffffff0 01ad4d28 ffffffff0
00000002 00000000
[ 134.095198 ]
[ 134.095198 ] X22: 0xffffffff001e52f80:
[ 134.100199 ] 2f80 00000000 00000000 0142c6a0 ffffffff0 00000000 00000000
01421788 ffffffff0
[ 134.108307 ] 2fa0 00000000 00000000 00000000 00000000 01420110 ffffffff0
00000000 00000000
[ 134.116414 ] 2fc0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.124522 ] 2fe0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.132629 ] 3000 00000000 00000000 00000000 00000000 01e53010 ffffffff0
01e53010 ffffffff0
[ 134.140737 ] 3020 00000000 00000000 00000000 00000000 01cbc8d0 ffffffff0
00000000 00000000
[ 134.148844 ] 3040 0000000a 00000001 00000000 00000000 01e52f30 ffffffff0
582cd918 ffffffff0
[ 134.156952 ] 3060 582cd918 ffffffff0 00500002 00000001 00020001 00000000
00000000 00000000
[ 134.165061 ]
[ 134.165061 ] X27: 0xffffffff001c93f80:
[ 134.170062 ] 3f80 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.178169 ] 3fa0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.186277 ] 3fc0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.194384 ] 3fe0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.202492 ] 4000 01236c60 ffffffff0 01237578 ffffffff0 01237df0 ffffffff0
01237e38 ffffffff0
[ 134.210599 ] 4020 01237ff0 ffffffff0 0120e738 ffffffff0 0120e830 ffffffff0
0120e928 ffffffff0
[ 134.218707 ] 4040 0120e9f0 ffffffff0 0120ea90 ffffffff0 0120eb30 ffffffff0
0120ebb8 ffffffff0
[ 134.226814 ] 4060 0120ec50 ffffffff0 0120ece8 ffffffff0 0120ed60 ffffffff0
```



```

0120ee28 ffffffff0
[ 134.234923]
[ 134.234923] X28: 0xffffffffc050b8ff80:
[ 134.239924] ff80 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.248032] ffa0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.256139] ffc0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.264247] ffe0 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.272354] 0000 00000000 00000000 ffffffff ffffffff 73b9ec80 ffffffff0
01c97540 ffffffff0
[ 134.280462] 0020 010c2508 ffffffff0 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.288569] 0040 00000000 00000000 00000000 00000000 00000003 00000000
57ac6e9d 00000000
[ 134.296677] 0060 1008ff14 00000000 00010101 1008ff97 00000000 00000000
00000000 00010101
[ 134.304785]
[ 134.304785] X29: 0xffffffffc050b93d10:
[ 134.309787] 3d10 00000063 00000000 01ce7b88 ffffffff0 01e53000 ffffffff0
00000140 00000000
[ 134.317894] 3d30 00000004 00000000 00000000 00000000 00000040 00000000
01c94000 ffffffff0
[ 134.326002] 3d50 50b90000 ffffffff0 50b93d90 ffffffff0 0142dcb0 ffffffff0
50b93d90 ffffffff0
[ 134.334109] 3d70 0142d144 ffffffff0 800001c5 00000000 01c899b8 ffffffff0
00000030 00000000
[ 134.342217] 3d90 50b93da0 ffffffff0 0142dcb0 ffffffff0 50b93df0 ffffffff0
0142e154 ffffffff0
[ 134.350324] 3db0 00000002 00000000 004fc408 00000000 004fc408 00000000
00000002 00000000
[ 134.358432] 3dd0 50b93ec8 ffffffff0 00000015 00000000 00000117 00000000
011e5c70 ffffffff0
[ 134.366539] 3df0 50b93e10 ffffffff0 01252954 ffffffff0 582bc100 ffffffff0
4cd9ca00 ffffffff0
[ 134.374647]
[ 134.376115] Process bash (pid: 1356, stack limit = 0xffffffffc050b90058)
[ 134.382584] Stack: (0xffffffffc050b93d90 to 0xffffffffc050b94000)
[ 134.388277] 3d80: 50b93da0 ffffffff0
0142dcb0 ffffffff0
[ 134.396385] 3da0: 50b93df0 ffffffff0 0142e154 ffffffff0 00000002 00000000
004fc408 00000000
[ 134.404492] 3dc0: 004fc408 00000000 00000002 00000000 50b93ec8 ffffffff0
00000015 00000000
[ 134.412600] 3de0: 00000117 00000000 011e5c70 ffffffff0 50b93e10 ffffffff0
01252954 ffffffff0
[ 134.420708] 3e00: 582bc100 ffffffff0 4cd9ca00 ffffffff0 50b93e50 ffffffff0
011e5b58 ffffffff0
[ 134.428815] 3e20: 4cd9ca00 ffffffff0 00000002 00000000 50b90000 ffffffff0

```

```
004fc408 00000000
[ 134.436923] 3e40: 50b93ec8 ffffffff0 004fc408 00000000 50b93e90 ffffffff0
011e668c ffffffff0
[ 134.445030] 3e60: 4cd9ca00 ffffffff0 4cd9ca00 ffffffff0 004fc408 00000000
00000002 00000000
[ 134.453138] 3e80: 20000000 00000000 00000015 00000000 e0736830 0000007f
0108426c ffffffff0
[ 134.461245] 3ea0: 00000002 00000000 004fc408 00000000 ffffffff ffffffff
93f191c8 0000007f
[ 134.469352] 3ec0: 00000000 00000000 00000000 00000000 00000001 00000000
004fc408 00000000
[ 134.477460] 3ee0: 00000002 00000000 00000000 00000000 00000001 00000000
00015551 00000000
[ 134.485568] 3f00: 004fc408 00000000 7f7f7f7f 7f7f7f7f 00000040 00000000
7f7f7f7f 7f7f7f7f
[ 134.493675] 3f20: 01010101 01010101 7f7f7f7f 7f7f7f7f 01010101 01010101
00000000 00000000
[ 134.501783] 3f40: 00000000 00000000 94035000 0000007f 00000000 00000000
93ec63d0 0000007f
[ 134.509890] 3f60: ffffffff0 00000000 00000002 00000000 004fc408 00000000
93fa1488 0000007f
[ 134.517997] 3f80: 00000002 00000000 004d2b80 00000000 004f5000 00000000
004f2000 00000000
[ 134.526105] 3fa0: 00000001 00000000 00501528 00000000 005fe2c8 00000000
e0736830 0000007f
[ 134.534213] 3fc0: 93ec91b8 0000007f e0736830 0000007f 93f191c8 0000007f
20000000 00000000
[ 134.542320] 3fe0: 00000001 00000000 00000040 00000000 00000000 00000000
00000000 00000000
[ 134.550424] Call trace:
[ 134.552846] [<ffffffc00142d144>] sysrq_handle_crash+0x24/0x30
[ 134.558534] [<ffffffc00142dcb0>] __handle_sysrq+0x130/0x198
[ 134.564055] [<ffffffc00142e154>] write_sysrq_trigger+0x5c/0x70
[ 134.569836] [<ffffffc001252954>] proc_reg_write+0x84/0xc0
[ 134.575183] [<ffffffc0011e5b58>] vfs_write+0xb0/0x1d8
[ 134.580183] [<ffffffc0011e668c>] Sys_write+0x54/0xb0
[ 134.585100] Code: 52800020 b904f020 d5033e9f d2800001 (39000020)
[ 134.591293] ---[ end trace d4597dbc36f7e6ab ]---
[ 134.595752] Kernel panic - not syncing: Fatal exception
[ 134.600898] CPU2: stopping
[ 134.603564] CPU: 2 PID: Comm: swapper/2 Tainted: G D
3.14.79-115 #1
[ 134.610802] Call trace:
[ 134.613233] [<ffffffc001088e40>] dump_backtrace+0x0/0x128
[ 134.618565] [<ffffffc001088f8c>] show_stack+0x24/0x30
[ 134.623574] [<ffffffc001888f44>] dump_stack+0x88/0xac
[ 134.628571] [<ffffffc001090018>] handle_IPI+0x1c0/0x1d0
[ 134.633745] [<ffffffc00108143c>] gic_handle_irq+0x84/0x88
[ 134.639091] Exception stack(0xffffffc05b133e30 to 0xffffffc05b133f50)
```

```

[ 134.645475] 3e20:                5b130000 ffffffff0
0189d000 ffffffff0
[ 134.653583] 3e40: 5b133f70 ffffffff0 01085138 ffffffff0 011075a0 ffffffff0
00000000 00000000
[ 134.661690] 3e60: 741add14 ffffffff0 00000000 01000000 01de7000 ffffffff0
00006924 00000000
[ 134.669798] 3e80: 1bf14d20 00069134 08568253 00000000 3b9aca00 00000000
5b133da0 ffffffff0
[ 134.677905] 3ea0: 00000400 00000000 f5da50b0 0000007f 4c2ff636 ffb44ebe
0003ab80 00000000
[ 134.686013] 3ec0: 10535586 8c220af8 00300000 00000000 01232ce0 ffffffff0
915441a8 0000007f
[ 134.694121] 3ee0: 00000038 00000000 5b130000 ffffffff0 0189d000 ffffffff0
01d59000 ffffffff0
[ 134.702228] 3f00: 01c89a6c ffffffff0 01d583ac ffffffff0 01aa5270 ffffffff0
5b130000 ffffffff0
[ 134.710335] 3f20: 02181000 00000000 01080220 ffffffff0 00000000 00000040
5b133f70 ffffffff0
[ 134.718441] 3f40: 01085134 ffffffff0 5b133f70 ffffffff0
[ 134.723445] [<ffffffc001083dac>] e11_irq+0x6c/0xd8
[ 134.728192] [<ffffffc0011075a0>] cpu_startup_entry+0x238/0x288
[ 134.733968] [<ffffffc00108fa5c>] secondary_start_kernel+0x11c/0x128
[ 134.740176] CPU1: stopping
[ 134.742851] CPU: 1 PID:   Comm: swapper/1 Tainted: G      D
3.14.79-115 #1
[ 134.750093] Call trace:
[ 134.752511] [<ffffffc001088e40>] dump_backtrace+0x0/0x128
[ 134.757859] [<ffffffc001088f8c>] show_stack+0x24/0x30
[ 134.762861] [<ffffffc001888f44>] dump_stack+0x88/0xac
[ 134.767863] [<ffffffc001090018>] handle_IPI+0x1c0/0x1d0
[ 134.773037] [<ffffffc00108143c>] gic_handle_irq+0x84/0x88
[ 134.778384] Exception stack(0xffffffc05b12be30 to 0xffffffc05b12bf50)
[ 134.784768] be20:                5b128000 ffffffff0
0189d000 ffffffff0
[ 134.792876] be40: 5b12bf70 ffffffff0 01085138 ffffffff0 011075a0 ffffffff0
00000000 00000000
[ 134.800984] be60: 741a1d14 ffffffff0 00000000 01000000 01de7000 ffffffff0
00006924 00000000
[ 134.809091] be80: 1bf14d20 00069134 08568253 00000000 3b9aca00 00000000
5b12bda0 ffffffff0
[ 134.817199] bea0: 000003ff 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.825306] bec0: 00000000 00000000 00000000 00000000 011fb1f8 ffffffff0
96171938 0000007f
[ 134.833414] bee0: 00000000 00000000 5b128000 ffffffff0 0189d000 ffffffff0
01d59000 ffffffff0
[ 134.841521] bf00: 01c89a6c ffffffff0 01d583ac ffffffff0 01aa5270 ffffffff0
5b128000 ffffffff0
[ 134.849629] bf20: 02181000 00000000 01080220 ffffffff0 00000000 00000040
5b12bf70 ffffffff0
[ 134.857735] bf40: 01085134 ffffffff0 5b12bf70 ffffffff0

```

```
[ 134.862737] [<ffffffc001083dac>] ell_irq+0x6c/0xd8
[ 134.867482] [<ffffffc0011075a0>] cpu_startup_entry+0x238/0x288
[ 134.873260] [<ffffffc00108fa5c>] secondary_start_kernel+0x11c/0x128
[ 134.879469] CPU3: stopping
[ 134.882145] CPU: 3 PID: Comm: swapper/3 Tainted: G      D
3.14.79-115 #1
[ 134.889387] Call trace:
[ 134.891805] [<ffffffc001088e40>] dump_backtrace+0x0/0x128
[ 134.897152] [<ffffffc001088f8c>] show_stack+0x24/0x30
[ 134.902154] [<ffffffc001888f44>] dump_stack+0x88/0xac
[ 134.907156] [<ffffffc001090018>] handle_IPI+0x1c0/0x1d0
[ 134.912331] [<ffffffc00108143c>] gic_handle_irq+0x84/0x88
[ 134.917678] Exception stack(0xffffffc05b137e30 to 0xffffffc05b137f50)
[ 134.924062] 7e20:                                5b134000 fffffffc0
0189d000 fffffffc0
[ 134.932170] 7e40: 5b137f70 fffffffc0 01085138 fffffffc0 011075a0 fffffffc0
00000000 00000000
[ 134.940278] 7e60: 741b9d14 fffffffc0 00000000 01000000 00000418 00000000
00000014 00000000
[ 134.948385] 7e80: 47195ee0 000657fb 08560d23 00000000 3b9aca00 00000000
5b137da0 fffffffc0
[ 134.956492] 7ea0: ffffbf61 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.964600] 7ec0: 00000000 00000000 00000000 00000000 00000000 00000000
00000000 00000000
[ 134.972708] 7ee0: 00000014 00000000 5b134000 fffffffc0 0189d000 fffffffc0
01d59000 fffffffc0
[ 134.980815] 7f00: 01c89a6c fffffffc0 01d583ac fffffffc0 01aa5270 fffffffc0
5b134000 fffffffc0
[ 134.988923] 7f20: 02181000 00000000 01080220 fffffffc0 00000000 00000040
5b137f70 fffffffc0
[ 134.997029] 7f40: 01085134 fffffffc0 5b137f70 fffffffc0
[ 135.002031] [<ffffffc001083dac>] ell_irq+0x6c/0xd8
[ 135.006775] [<ffffffc0011075a0>] cpu_startup_entry+0x238/0x288
[ 135.012554] [<ffffffc00108fa5c>] secondary_start_kernel+0x11c/0x128
GXBB:BL1:08dafd:0a8993;FEAT:EDFC318C;POC:3;RCY:;EMMC:800;NAND:81;SD:;READ:;C
HK:;
TE: 99044
no sdio debug board detected

BL2 Built : 11:44:26, Nov 25 2015.
gxb gfb13a3b-c2 - jcao@wonton

Board ID = 8
set vcck to 1100 mv
set vddee to 1050 mv
CPU clk: 1536MHz
DDR channel setting: DDR0 Rank0+1 same
DDR0: 2048MB(auto) @ 912MHz(2T)-13
```

```
DataBus test pass!
AddrBus test pass!
Load fip header from SD, src: 0x0000c200, des: 0x01400000, size: 0x000000b0
Load bl30 from SD, src: 0x00010200, des: 0x01000000, size: 0x00009ef0
Sending bl30.....OK.
Run bl30...
Load bl301 from SD, src: 0x0001c200, des: 0x01000000, size: 0x000018c0
Wait bl30...Done
Sending bl301.....OK.
Run bl301...
D, src: 0x00020200, des: 0x10100000, size: 0x00011130

--- UART initialized after reboot ---
[Reset cause: unknown]
[Image: unknown, amlogic_v1.1.3046-00db630-dirty 2016-08-31 09:24:14
tao.zeng@droid04]
bl30: check_permit, count is 1
bl30: check_permit: ok!
chipid:Load bl33 from SD, src: 0x00034200, des: 0x01000000, size: 0x00073510
ef be ad de d f0 ad ba ef be ad de not ES chip
[0.213749 Inits done]
secure task start!
high task start!
low task start!
NOTICE: BL3-1: v1.0(debug):4d2e34d
NOTICE: BL3-1: Built : 17:08:35, Oct 29 2015
INFO: BL3-1: Initializing runtime services
INFO: BL3-1: Preparing for EL3 exit to normal world
INFO: BL3-1: Next image address = 0x1000000
INFO: BL3-1: Next image spsr = 0x3c9
```

From:

<http://wiki.odroid.com/> - **ODROID Wiki**

Permanent link:

[http://wiki.odroid.com/odroid-c2/application\\_note/software/watchdog\\_timer](http://wiki.odroid.com/odroid-c2/application_note/software/watchdog_timer)

Last update: **2018/03/16 09:17**

