

# AMD64 Machine hardlocks when using memset

**Source:** <http://linux.derkeiler.com/Mailing-Lists/Kernel/2005-03/9491.html>

---

**From:** Philip Lawatsch (*philip\_at\_lawatsch.at*)

**Date:** 03/31/05

Date: Thu, 31 Mar 2005 00:04:59 +0200

To: linux-kernel@vger.kernel.org

Hi,

I do have a very strange problem:

If I memset a ~1meg buffer some thousand times (in the userspace) it will hardlock my machine.

I've been using 2.6.12-rc1 and also a lot of other kernels (2.6.9, 2.6.11). I've tried it both using a 32 bit kernel and a 64 bit kernel. When running on the 32 bit kernel the machine hardlocks after about 15000 iterations, on a 64 bit kernel the machine hardlocks after about 5000 (the 64 bit system has nearly no background jobs running).

I've been running memcheck for several hours now but nothing did show up.

I've got an Asus A8N-SLI board with 2 gigs of memory and an AMD 3500+ CPU.

The 64 bit kernel was compiled using gcc 3.4.3 and the 32 bit kernel using 3.3.5.

This simple programm will kill my machine:

```
#include <stdlib.h>
#include <stdio.h>
int main(int argc, char *argv[])
{
    char buf[1024*1024];
    int i;
    for (i=0;i<1024*16;++i)
    {
        printf("%d\n",i);
        memset(buf,0,1024*1024);
    }
    printf("Done\n");
    return 0;
}
```

## Linux-Kernel: AMD64 Machine hardlocks when using memset

If I usleep for 1ms after each memset the whole thing will happily run forever without any problems.

Also if I start it twice (without sleeping in the loop) the machine wont hardlock either (tested with a 32 bit kernel).

I'd really appreciate any pointers as to what might be wrong here.

I've tried both kernels with and without preemption.

kind regards Philip

```
>Bootdata ok (command line is BOOT_IMAGE=test ro root=809)
Linux version 2.6.12-rc1 (root@localhost) (gcc version 3.4.3 20041125 (Gentoo Linux 3.4.3-r1,
ssp-3.4.3-0, pie-8.7.7)) #1 Wed Mar 30 23:30:20 CEST 2005
BIOS-provided physical RAM map:
 BIOS-e820: 0000000000000000 - 000000000009f800 (usable)
 BIOS-e820: 000000000009f800 - 00000000000a0000 (reserved)
 BIOS-e820: 00000000000f0000 - 0000000000100000 (reserved)
 BIOS-e820: 0000000000100000 - 0000000007fff000 (usable)
 BIOS-e820: 0000000007fff000 - 0000000007fff3000 (ACPI NVS)
 BIOS-e820: 0000000007fff3000 - 00000000080000000 (ACPI data)
 BIOS-e820: 00000000e0000000 - 00000000f0000000 (reserved)
 BIOS-e820: 00000000fec00000 - 00000000fec01000 (reserved)
 BIOS-e820: 00000000fee00000 - 00000000fef00000 (reserved)
 BIOS-e820: 00000000feffc00 - 00000000ff000000 (reserved)
 BIOS-e820: 00000000ffff0000 - 0000000100000000 (reserved)
ACPI: RSDP (v000 Nvidia ) @ 0x00000000000f78c0
ACPI: RSDT (v001 Nvidia AWRDACPI 0x42302e31 AWRD 0x00000000) @ 0x0000000007fff3040
ACPI: FADT (v001 Nvidia AWRDACPI 0x42302e31 AWRD 0x00000000) @ 0x0000000007fff30c0
ACPI: MCFG (v001 Nvidia AWRDACPI 0x42302e31 AWRD 0x00000000) @ 0x0000000007fff9540
ACPI: MADT (v001 Nvidia AWRDACPI 0x42302e31 AWRD 0x00000000) @ 0x0000000007fff9480
ACPI: DSDT (v001 NVIDIA AWRDACPI 0x00001000 MSFT 0x0100000e) @ 0x0000000000000000
On node 0 totalpages: 524272
 DMA zone: 4096 pages, LIFO batch:1
 Normal zone: 520176 pages, LIFO batch:16
 HighMem zone: 0 pages, LIFO batch:1
Nvidia board detected. Ignoring ACPI timer override.
ACPI: Local APIC address 0xfee00000
ACPI: LAPIC (acpi_id[0x00] lapic_id[0x00] enabled)
Processor #0 15:15 APIC version 16
ACPI: LAPIC_NMI (acpi_id[0x00] high edge lint[0x1])
ACPI: IOAPIC (id[0x02] address[0xfec00000] gsi_base[0])
IOAPIC[0]: apic_id 2, version 17, address 0xfec00000, GSI 0-23
ACPI: INT_SRC_OVR (bus 0 bus_irq 0 global_irq 2 dfl dfl)
ACPI: BIOS IRQ0 pin2 override ignored.
ACPI: INT_SRC_OVR (bus 0 bus_irq 9 global_irq 9 high level)
ACPI: INT_SRC_OVR (bus 0 bus_irq 14 global_irq 14 high edge)
```

## Linux–Kernel: AMD64 Machine hardlocks when using memset

ACPI: INT\_SRC\_OVR (bus 0 bus\_irq 15 global\_irq 15 high edge)  
ACPI: IRQ9 used by override.  
ACPI: IRQ14 used by override.  
ACPI: IRQ15 used by override.  
Setting APIC routing to flat  
Using ACPI (MADT) for SMP configuration information  
Built 1 zonelists  
Kernel command line: BOOT\_IMAGE=test ro root=809 console=tty0  
Initializing CPU#0  
PID hash table entries: 4096 (order: 12, 131072 bytes)  
time.c: Using 1.193182 MHz PIT timer.  
time.c: Detected 2211.376 MHz processor.  
Console: colour VGA+ 80x25  
Dentry cache hash table entries: 524288 (order: 10, 4194304 bytes)  
Inode–cache hash table entries: 262144 (order: 9, 2097152 bytes)  
Memory: 2056168k/2097088k available (3281k kernel code, 40236k reserved, 1386k data, 188k init)  
Calibrating delay loop... 4374.52 BogoMIPS (lpj=2187264)  
Mount–cache hash table entries: 256  
CPU: L1 I Cache: 64K (64 bytes/line), D cache 64K (64 bytes/line)  
CPU: L2 Cache: 512K (64 bytes/line)  
CPU: AMD Athlon(tm) 64 Processor 3500+ stepping 00  
Using local APIC NMI watchdog using perfctr0  
Using local APIC timer interrupts.  
Detected 12.564 MHz APIC timer.  
NET: Registered protocol family 16  
PCI: Using configuration type 1  
mtrr: v2.0 (20020519)  
ACPI: Subsystem revision 20050211  
ACPI: Interpreter enabled  
ACPI: Using IOAPIC for interrupt routing  
ACPI: PCI Root Bridge [PCI0] (00:00)  
PCI: Probing PCI hardware (bus 00)  
PCI: Transparent bridge – 0000:00:09.0  
ACPI: PCI Interrupt Routing Table [\_SB\_.PCI0.\_PRT]  
ACPI: PCI Interrupt Routing Table [\_SB\_.PCI0.HUB0.\_PRT]  
ACPI: PCI Interrupt Link [LNK1] (IRQs 3 4 5 7 9 10 11 \*12 14 15)  
ACPI: PCI Interrupt Link [LNK2] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LNK3] (IRQs 3 4 \*5 7 9 10 11 12 14 15)  
ACPI: PCI Interrupt Link [LNK4] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LNK5] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LUBA] (IRQs 3 4 \*5 7 9 10 11 12 14 15)  
ACPI: PCI Interrupt Link [LUBB] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LMAC] (IRQs 3 4 5 7 9 10 \*11 12 14 15)  
ACPI: PCI Interrupt Link [LACI] (IRQs \*3 4 5 7 9 10 11 12 14 15)  
ACPI: PCI Interrupt Link [LMCI] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LSMB] (IRQs 3 4 5 7 9 10 \*11 12 14 15)  
ACPI: PCI Interrupt Link [LUB2] (IRQs \*3 4 5 7 9 10 11 12 14 15)  
ACPI: PCI Interrupt Link [LIDE] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.  
ACPI: PCI Interrupt Link [LSID] (IRQs 3 4 5 7 9 10 \*11 12 14 15)  
ACPI: PCI Interrupt Link [LFID] (IRQs 3 4 5 7 9 10 11 \*12 14 15)  
ACPI: PCI Interrupt Link [LPCA] (IRQs 3 4 5 7 9 10 11 12 14 15) \*0, disabled.

## Linux-Kernel: AMD64 Machine hardlocks when using memset

ACPI: PCI Interrupt Link [APC1] (IRQs \*16), disabled.  
ACPI: PCI Interrupt Link [APC2] (IRQs \*17), disabled.  
ACPI: PCI Interrupt Link [APC3] (IRQs \*18), disabled.  
ACPI: PCI Interrupt Link [APC4] (IRQs \*19), disabled.  
ACPI: PCI Interrupt Link [APC5] (IRQs \*16), disabled.  
ACPI: PCI Interrupt Link [APCF] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCG] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCH] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCJ] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCK] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCS] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCL] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCZ] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APSI] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APSJ] (IRQs 20 21 22 23) \*0, disabled.  
ACPI: PCI Interrupt Link [APCP] (IRQs 20 21 22 23) \*0, disabled.  
SCSI subsystem initialized  
usbcore: registered new driver usbfs  
usbcore: registered new driver hub  
PCI: Using ACPI for IRQ routing  
PCI: If a device doesn't work, try "pci=routeirq". If it helps, post a report  
TC classifier action (bugs to netdev@oss.sgi.com cc hadi@cyberus.ca)  
IA32 emulation \$Id: sys\_ia32.c,v 1.32 2002/03/24 13:02:28 ak Exp \$  
Total HugeTLB memory allocated, 0  
devfs: 2004-01-31 Richard Gooch (rgooch@atnf.csiro.au)  
devfs: boot\_options: 0x0  
JFS: nTxBlock = 8192, nTxLock = 65536  
SGI XFS with ACLs, large block/inode numbers, no debug enabled  
Initializing Cryptographic API  
pci\_hotplug: PCI Hot Plug PCI Core version: 0.5  
acpiphp: ACPI Hot Plug PCI Controller Driver version: 0.4  
ACPI: Power Button (FF) [PWRFB]  
ACPI: Fan [FAN] (on)  
ACPI: Processor [CPU0] (supports 8 throttling states)  
ACPI: Thermal Zone [THRM] (40 C)  
Real Time Clock Driver v1.12  
Non-volatile memory driver v1.2  
[drm] Initialized drm 1.0.0 20040925  
serio: i8042 AUX port at 0x60,0x64 irq 12  
serio: i8042 KBD port at 0x60,0x64 irq 1  
Serial: 8250/16550 driver \$Revision: 1.90 \$ 8 ports, IRQ sharing disabled  
ttyS0 at I/O 0x3f8 (irq = 4) is a 16550A  
ttyS0 at I/O 0x3f8 (irq = 4) is a 16550A  
io scheduler noop registered  
io scheduler anticipatory registered  
io scheduler deadline registered  
io scheduler cfq registered  
RAMDISK driver initialized: 16 RAM disks of 8192K size 1024 blocksize  
loop: loaded (max 8 devices)  
forcedeth.c: Reverse Engineered nForce ethernet driver. Version 0.31.  
ACPI: PCI Interrupt Link [APCH] enabled at IRQ 23

## Linux-Kernel: AMD64 Machine hardlocks when using memset

```
ACPI: PCI interrupt 0000:00:0a.0[A] -> GSI 23 (level, low) -> IRQ 23
PCI: Setting latency timer of device 0000:00:0a.0 to 64
eth0: forcedeth.c: subsystem: 01043:8141 bound to 0000:00:0a.0
Uniform Multi-Platform E-IDE driver Revision: 7.00alpha2
ide: Assuming 33MHz system bus speed for PIO modes; override with idebus=xx
NFORCE-CK804: IDE controller at PCI slot 0000:00:06.0
NFORCE-CK804: chipset revision 162
NFORCE-CK804: not 100% native mode: will probe irqs later
NFORCE-CK804: BIOS didn't set cable bits correctly. Enabling workaround.
NFORCE-CK804: 0000:00:06.0 (rev a2) UDMA133 controller
  ide0: BM-DMA at 0xf000-0xf007, BIOS settings: hda:DMA, hdb:DMA
  ide1: BM-DMA at 0xf008-0xf00f, BIOS settings: hdc:DMA, hdd:DMA
Probing IDE interface ide0...
hda: PIONEER DVD-RW DVR-109, ATAPI CD/DVD-ROM drive
hdb: PHILIPS DROM5016L, ATAPI CD/DVD-ROM drive
ide0 at 0x1f0-0x1f7,0x3f6 on irq 14
Probing IDE interface ide1...
Probing IDE interface ide1...
Probing IDE interface ide2...
Probing IDE interface ide3...
Probing IDE interface ide4...
Probing IDE interface ide5...
hda: ATAPI 40X DVD-ROM DVD-R CD-R/RW drive, 2000kB Cache, UDMA(66)
Uniform CD-ROM driver Revision: 3.20
hdb: ATAPI 48X DVD-ROM drive, 512kB Cache, UDMA(33)
libata version 1.10 loaded.
sata_nv version 0.6
ACPI: PCI Interrupt Link [APSI] enabled at IRQ 22
ACPI: PCI interrupt 0000:00:07.0[A] -> GSI 22 (level, low) -> IRQ 22
PCI: Setting latency timer of device 0000:00:07.0 to 64
ata1: SATA max UDMA/133 cmd 0x9F0 ctl 0xBF2 bmdma 0xD800 irq 22
ata2: SATA max UDMA/133 cmd 0x970 ctl 0xB72 bmdma 0xD808 irq 22
ata1: no device found (phy stat 00000000)
scsi0 : sata_nv
ata2: no device found (phy stat 00000000)
scsi1 : sata_nv
ACPI: PCI Interrupt Link [APSJ] enabled at IRQ 21
ACPI: PCI interrupt 0000:00:08.0[A] -> GSI 21 (level, low) -> IRQ 21
PCI: Setting latency timer of device 0000:00:08.0 to 64
ata3: SATA max UDMA/133 cmd 0x9E0 ctl 0xBE2 bmdma 0xC400 irq 21
ata4: SATA max UDMA/133 cmd 0x960 ctl 0xB62 bmdma 0xC408 irq 21
ata3: dev 0 cfg 49:2f00 82:7c6b 83:7f09 84:4063 85:7c68 86:3e01 87:4063 88:407f
ata3: dev 0 ATA, max UDMA/133, 398297088 sectors: lba48
nv_sata: Primary device added
nv_sata: Primary device removed
nv_sata: Secondary device added
nv_sata: Secondary device removed
ata3: dev 0 configured for UDMA/133
scsi2 : sata_nv
ata4: no device found (phy stat 00000000)
scsi3 : sata_nv
```

## Linux–Kernel: AMD64 Machine hardlocks when using memset

Vendor: ATA Model: Maxtor 6B200M0 Rev: BANC  
Type: Direct–Access ANSI SCSI revision: 05  
SCSI device sda: 398297088 512–byte hdwr sectors (203928 MB)  
SCSI device sda: drive cache: write back  
SCSI device sda: 398297088 512–byte hdwr sectors (203928 MB)  
SCSI device sda: drive cache: write back  
/dev/scsi/host2/bus0/target0/lun0: p1 p2 < p5 p6 p7 p8 p9 p10 >  
Attached scsi disk sda at scsi2, channel 0, id 0, lun 0  
Attached scsi generic sg0 at scsi2, channel 0, id 0, lun 0, type 0  
usbmon: debugs is not available  
mice: PS/2 mouse device common for all mice  
md: linear personality registered as nr 1  
md: raid0 personality registered as nr 2  
md: raid1 personality registered as nr 3  
md: raid5 personality registered as nr 4  
raid5: automatically using best checksumming function: generic\_sse  
generic\_sse: 6776.000 MB/sec  
raid5: using function: generic\_sse (6776.000 MB/sec)  
raid6: int64x1 2042 MB/s  
raid6: int64x2 2949 MB/s  
raid6: int64x4 2886 MB/s  
raid6: int64x8 1921 MB/s  
raid6: sse2x1 906 MB/s  
raid6: sse2x2 1773 MB/s  
raid6: sse2x4 3062 MB/s  
raid6: using algorithm sse2x4 (3062 MB/s)  
md: raid6 personality registered as nr 8  
md: multipath personality registered as nr 7  
md: md driver 0.90.1 MAX\_MD\_DEVS=256, MD\_SB\_DISKS=27  
device–mapper: 4.4.0–ioctl (2005–01–12) initialised: dm–devel@redhat.com  
Advanced Linux Sound Architecture Driver Version 1.0.8 (Thu Jan 13 09:39:32 2005 UTC).  
ALSA device list:  
No soundcards found.  
NET: Registered protocol family 2  
IP: routing cache hash table of 16384 buckets, 128Kbytes  
TCP established hash table entries: 524288 (order: 10, 4194304 bytes)  
TCP bind hash table entries: 65536 (order: 7, 524288 bytes)  
TCP: Hash tables configured (established 524288 bind 65536)  
NET: Registered protocol family 1  
NET: Registered protocol family 10  
Disabled Privacy Extensions on device ffffffff80538620(lo)  
IPv6 over IPv4 tunneling driver  
NET: Registered protocol family 17  
NET: Registered protocol family 15  
powernow–k8: Found 1 AMD Athlon 64 / Opteron processors (version 1.00.09e)  
powernow–k8: 0 : fid 0xe (2200 MHz), vid 0x6 (1400 mV)  
powernow–k8: 1 : fid 0xc (2000 MHz), vid 0x8 (1350 mV)  
powernow–k8: 2 : fid 0xa (1800 MHz), vid 0xa (1300 mV)  
powernow–k8: 3 : fid 0x2 (1000 MHz), vid 0x12 (1100 mV)  
cpu\_init done, current fid 0xe, vid 0x6  
ACPI wakeup devices:

## Linux–Kernel: AMD64 Machine hardlocks when using memset

HUB0 XVR0 XVR1 XVR2 XVR3 USB0 USB2 MMAC MMCI UAR1  
ACPI: (supports S0 S1 S3 S4 S5)  
BIOS EDD facility v0.16 2004–Jun–25, 1 devices found  
devfs\_mk\_dev: could not append to parent for md/0  
md: Autodetecting RAID arrays.  
md: autorun ...  
md: ... autorun DONE.  
kjournald starting. Commit interval 5 seconds  
EXT3–fs: mounted filesystem with ordered data mode.  
VFS: Mounted root (ext3 filesystem) readonly.  
Freeing unused kernel memory: 188k freed  
input: AT Translated Set 2 keyboard on isa0060/serio0  
Adding 1959888k swap on /dev/sda6. Priority:–1 extents:1  
EXT3 FS on sda9, internal journal  
kjournald starting. Commit interval 5 seconds  
EXT3 FS on sda8, internal journal  
EXT3–fs: mounted filesystem with ordered data mode.  
i2c\_adapter i2c–0: nForce2 SMBus adapter at 0x4c00  
i2c\_adapter i2c–1: nForce2 SMBus adapter at 0x4c40  
ohci\_hcd: 2004 Nov 08 USB 1.1 'Open' Host Controller (OHCI) Driver (PCI)  
ACPI: PCI Interrupt Link [APCF] enabled at IRQ 20  
ACPI: PCI interrupt 0000:00:02.0[A] –> GSI 20 (level, low) –> IRQ 20  
PCI: Setting latency timer of device 0000:00:02.0 to 64  
ohci\_hcd 0000:00:02.0: nVidia Corporation CK804 USB Controller  
ohci\_hcd 0000:00:02.0: new USB bus registered, assigned bus number 1  
ohci\_hcd 0000:00:02.0: irq 20, io mem 0xd0104000  
hub 1–0:1.0: USB hub found  
hub 1–0:1.0: 10 ports detected  
ACPI: PCI Interrupt Link [APCL] enabled at IRQ 23  
ACPI: PCI interrupt 0000:00:02.1[B] –> GSI 23 (level, low) –> IRQ 23  
PCI: Setting latency timer of device 0000:00:02.1 to 64  
ehci\_hcd 0000:00:02.1: nVidia Corporation CK804 USB Controller  
ehci\_hcd 0000:00:02.1: new USB bus registered, assigned bus number 2  
ehci\_hcd 0000:00:02.1: irq 23, io mem 0xd0105000  
PCI: cache line size of 64 is not supported by device 0000:00:02.1  
ehci\_hcd 0000:00:02.1: park 0  
ehci\_hcd 0000:00:02.1: USB 2.0 initialized, EHCI 1.00, driver 10 Dec 2004  
hub 2–0:1.0: USB hub found  
hub 2–0:1.0: 10 ports detected  
ACPI: PCI Interrupt Link [APCJ] enabled at IRQ 22  
ACPI: PCI interrupt 0000:00:04.0[A] –> GSI 22 (level, low) –> IRQ 22  
PCI: Setting latency timer of device 0000:00:04.0 to 64  
intel8x0\_measure\_ac97\_clock: measured 49642 usecs  
intel8x0: clocking to 46875  
usb 1–1: new full speed USB device using ohci\_hcd and address 3  
usb 1–2: new low speed USB device using ohci\_hcd and address 4  
usb 1–10: new full speed USB device using ohci\_hcd and address 5  
cdc\_acm 1–1:1.0: ttyACM0: USB ACM device  
usbcore: registered new driver cdc\_acm  
drivers/usb/class/cdc–acm.c: v0.23:USB Abstract Control Model driver for USB modems and ISDN adapters  
usbcore: registered new driver hiddev

## Linux-Kernel: AMD64 Machine hardlocks when using memset

input: USB HID v1.10 Mouse [B16\_b\_02 USB-PS/2 Optical Mouse] on usb-0000:00:02.0-2  
usbcore: registered new driver usbhid  
drivers/usb/input/hid-core.c: v2.01:USB HID core driver  
Bluetooth: Core ver 2.7  
NET: Registered protocol family 31  
Bluetooth: HCI device and connection manager initialized  
Bluetooth: HCI socket layer initialized  
Bluetooth: HCI USB driver ver 2.8  
usbcore: registered new driver hci\_usb  
ieee1394: Initialized config rom entry `ip1394'  
ohci1394: \$Rev: 1250 \$ Ben Collins <bcollins@debian.org>  
ACPI: PCI Interrupt Link [APC1] enabled at IRQ 16  
ACPI: PCI interrupt 0000:05:0b.0[A] -> GSI 16 (level, low) -> IRQ 16  
ohci1394: fw-host0: OHCI-1394 1.1 (PCI): IRQ=[16] MMIO=[d0004000-d00047ff] Max Packet=[2048]  
USB Universal Host Controller Interface driver v2.2  
ieee1394: Host added: ID:BUS[0-00:1023] GUID[0011d800000a00cc]  
eth1394: \$Rev: 1247 \$ Ben Collins <bcollins@debian.org>  
eth1394: eth1: IEEE-1394 IPv4 over 1394 Ethernet (fw-host0)

-

To unsubscribe from this list: send the line "unsubscribe linux-kernel" in  
the body of a message to majordomo@vger.kernel.org  
More majordomo info at <http://vger.kernel.org/majordomo-info.html>  
Please read the FAQ at <http://www.tux.org/lkml/>