Booting xtensa linux on qemu

It boots:

```
parse_bootparam(phys_tag:fe000020):
Linux version 2.6.29-rc7-ga0f0129-dirty (dumb@octofox.metropolis) (gcc
version 4.4.5 (GCC) ) #10 Tue Jun 21 23:13:31 MSD 2011
bootmem_init: sysmem.bank[i:0].{type:0, start:0x1000, end:0x3000}
bootmem_init: sysmem.bank[i:1].{type:0, start:0x142000, end:0x8000000}
bootmem_init: min_low_pfn:0x1, max_low_pfn:0x8000, max_pfn:0x8000
Built 1 zonelists in Zone order, mobility grouping on.  Total pages: 32480
Kernel command line: console=ttyS0,38400 root=/dev/simdisk0 init=/init
trap_init:
PID hash table entries: 512 (order: 9, 2048 bytes)
time_init: Platform Calibrating CPU frequency

__platform_calibrate_ccount: No Platform Specific routine available to
calibrate cpu frequency!
__platform_calibrate_ccount: Using Defaults derived from kernel .config
file.
time_init: ccount_per_jiffy:100000 [10.00 MHz], nsec_per_ccount:100
console [ttyS0] enabled
Console: colour dummy device 80x25
Dentry cache hash table entries: 16384 (order: 4, 65536 bytes)
Inode-cache hash table entries: 8192 (order: 3, 32768 bytes)
Memory: 128380k/131072k available (865k kernel code, 2536k reserved, 53k
data, 48k init 0k highmem)
SLUB: Genslabs=12, HWalign=32, Order=0-3, MinObjects=0, CPUs=1, Nodes=1
calibrate_delay: Calibrating delay loop (skipped)... 10.00 BogoMIPS preset
Mount-cache hash table entries: 512
net_namespace: 520 bytes
NET: Registered protocol family 16
bio: create slab <bio-0> at 0
NET: Registered protocol family 2
IP route cache hash table entries: 1024 (order: 0, 4096 bytes)
TCP established hash table entries: 4096 (order: 3, 32768 bytes)
TCP bind hash table entries: 4096 (order: 2, 16384 bytes)
TCP: Hash tables configured (established 4096 bind 4096)
TCP reno registered
NET: Registered protocol family 1
simdisk_init: SIMDISK: major: 240
simdisk_attach(dev:d7809000, filename:'x')
simdisk_attach: SIMDISK: disk_name:'simdisk0', filename:'x'
simdisk_attach(dev:d780941c, filename:'x')
simdisk_attach: SIMDISK: disk_name:'simdisk1', filename:'x'
msgmni has been set to 251
io scheduler noop registered (default)
loop: module loaded
Software Watchdog Timer: 0.07 initialized. soft_noboot=0 soft_margin=60 sec
```

```
(nowayout= 1)
TCP cubic registered
NET: Registered protocol family 17
ISS serial driver 0.1
VFS: Mounted root (ext2 filesystem) readonly on device 240:0.
free_initmem: Freeing unused/init kernel memory: ... 48k freed
EXT2-fs warning: mounting unchecked fs, running e2fsck is recommended
Starting portmap: done
Initializing random number generator... done.
Starting network...
ip: RTNETLINK answers: File exists



Welcome to your custom Xtensa processor based uClibc environment.
uclibc login:
```

Issues

wrong address generated for jump in kernel_exception_return

arch/xtensa/kernel/entry.S:777

```
        movi    a0, 1f + (0x40000000 - 0xC0000000)      # Calculate Return
address for "1f" and store in a0
        rsil    a2, XCHAL_EXCM_LEVEL    # FIXME: again, only do this if
PS.INTLEVEL <= EXCM_LEVEL
        retw                            # rotate back by 4 registers,
possibly with underflow
                                        # Back out our _entry Frame above...

                                        # ... We return here from above
retw.
1:      mov     a1, a5                  # our a1 became a5 at the above
_entry, a1 = a5
```

Assembled it looks like this:

```
0010 ffffff3f 00000000 000000c0 05030080
...
                        1c: R_XTENSA_32 .text
...
 2fd:   000001          l32r    a0, fffc0300 <ret_from_fork+0xfffbf858>
                        2fd: R_XTENSA_SLOT0_OP  .literal+0x1c
 300:   006320          rsil    a2, 3
 303:   f01d            retw.n
 305:   051d            mov.n   a1, a5
```

Linked vmlinux looks like this (broken, word at d000357c should be 2d3d0050):

```
d0003570 ffffff3f e83b00d0 000000c0 cd3c0050
...
d0003d25:       fe1501          l32r    a0, d000357c <T$339+0x68>
d0003d28:       006320          rsil    a2, 3
d0003d2b:       f01d            retw.n
d0003d2d:       051d            mov.n   a1, a5
```

Looks like bug in linker. Cured by the following patch:

```
diff --git a/arch/xtensa/kernel/entry.S b/arch/xtensa/kernel/entry.S
index 0cb1530..e7b2263 100644
--- a/arch/xtensa/kernel/entry.S
+++ b/arch/xtensa/kernel/entry.S
@@ -774,7 +774,9 @@ _kernel_exception:
 #endif

        l32i    a3, a1, PT_PS                           # a3 = ptregs->ps
[NOTE: Used below after retw]
-       movi    a0, 1f + (0x40000000 - 0xC0000000)      # Calculate Return
address for "1f" and store in a0
+       movi    a0, 1f # + (0x40000000 - 0xC0000000)    # Calculate Return
address for "1f" and store in a0
+       movi    a2, 0x40000000 - 0xC0000000
+       add     a0, a0, a2
        rsil    a2, XCHAL_EXCM_LEVEL    # FIXME: again, only do this if
PS.INTLEVEL <= EXCM_LEVEL
        retw                            # rotate back by 4 registers,
possibly with underflow
                                        # Back out our _entry Frame above...
```

Random symbols appear like being typed on the console

There's no checks for select simcall error status (or maybe there just should not be EINTR error, that's just not documented). Fix is the following:

```
diff --git a/arch/xtensa/platforms/iss/console.c
b/arch/xtensa/platforms/iss/console.c
index e650152..285744e 100644
--- a/arch/xtensa/platforms/iss/console.c
+++ b/arch/xtensa/platforms/iss/console.c
@@ -126,10 +126,11 @@ static void rs_poll(unsigned long priv)

        spin_lock(&timer_lock);

-       while (__simc(SYS_select_one, 0, XTISS_SELECT_ONE_READ,
(int)&tv,0,0)){
-               __simc (SYS_read, 0, (unsigned long)&c, 1, 0, 0);
```

```
-               tty_insert_flip_char(tty, c, TTY_NORMAL);
-               i++;
+       while (__simc(SYS_select_one, 0, XTISS_SELECT_ONE_READ,
(int)&tv,0,0) > 0) {
+               if (__simc (SYS_read, 0, (unsigned long)&c, 1, 0, 0) == 1) {
+                       tty_insert_flip_char(tty, c, TTY_NORMAL);
+                       i++;
+               }
        }

        if (i)
```

Console is tooooo slooooow

There's polling timer, it's 20 seconds :(). Fix is the following:

```
diff --git a/arch/xtensa/platforms/iss/console.c
b/arch/xtensa/platforms/iss/console.c
index e650152..285744e 100644
--- a/arch/xtensa/platforms/iss/console.c
+++ b/arch/xtensa/platforms/iss/console.c
@@ -35,7 +35,7 @@
 #endif

 #define SERIAL_MAX_NUM_LINES 1
-#define SERIAL_TIMER_VALUE (20 * HZ)
+#define SERIAL_TIMER_VALUE (HZ / 10)

 static struct tty_driver *serial_driver;
 static struct timer_list serial_timer;
```

From:
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http://wiki.osll.ru/doku.php/etc:users:jcmvbkbc:xtensa-linux

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