

Compiling busy box dynamically for the firsts rootfs on mmcblk0p2:

```
[ ] Support NSA Security Enhanced Linux
[ ] Clean up all memory before exiting (usually not needed)
[*] Support LOG_INFO level syslog messages
--- Build Options
[[ ]] Build static binary (no shared libs)
[ ] Build position independent executable (NEW)
↓(+)
```

```
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox$ cd _install/
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ cd bin/
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install/bin$ file busybox
busybox: ELF 32-bit LSB executable, ARM, EABI5 version 1 (SYSV), dynamically linked, interpreter /lib/ld-linux-armhf.so.3, for GNU/Linux 3.2.0, stripped
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install/bin$ cd ..
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ sudo cp -r ./* ../../qemu/root1/
[sudo] password for adhamwala:
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$
```

copying the required libs to the rootfs:

```
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox$ cd _install/
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ cd bin/
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install/bin$ file busybox
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adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install/bin$ cd ..
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ sudo cp -r ./* ../../qemu/root1/
[sudo] password for adhamwala:
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ cd
adhamwala@adhamwala-G3-3500:~/embedded_linux_kitchen/busybox/_install$ cd x-tools/arm-cortexa9_neon-linux-gnueabi/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi$ ls
arm-cortexa9_neon-linux-gnueabi$ bin build.log.bz2 include lib libexec share
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi$ cd arm-cortexa9_neon-linux-gnueabi/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi$ ls
bin debug-root include lib sysroot
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi$ cd sysroot/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ ls
etc lib sbin usr var
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp sbin/* ~/embedded_linux_kitchen/qemu/root1/s
bin/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp -r lib etc var ~/embedded_linux_kitchen/qemu
/root1
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp usr/bin/* ~/embedded_linux_kitchen/qemu/root
1/usr/bin/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp usr/* ~/embedded_linux_kitchen/qemu/root1/u
sr/bin/
bin/ include/ lib/ libexec/ sbin/ share/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ ls usr/
bin/ include/ lib/ libexec/ sbin/ share/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp usr/sbin/ ~/embedded_linux_kitchen/qemu/root
1/usr/sbin/
cp: -r not specified; omitting directory 'usr/sbin/'
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp -r usr/sbin/ ~/embedded_linux_kitchen/qemu/r
oot1/usr/sbin/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp -r usr/include/ ~/embedded_linux_kitchen/qem
u/root1/usr/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp -r usr/libexec/ ~/embedded_linux_kitchen/qem
u/root1/usr/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$ sudo cp -r usr/share/ ~/embedded_linux_kitchen/qemu/
root1/usr/
adhamwala@adhamwala-G3-3500:~/x-tools/arm-cortexa9_neon-linux-gnueabi/arm-cortexa9_neon-linux-gnueabi/sysroot$
```

Busybox init process:

on startup the inittab first runs the script rcS under the init.d directory the waits for input from the user to open up a shell:

```
Activities Terminal Feb 11 18:38
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc

adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1$ ls
bin etc lib linuxrc sbin usr var
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1$ cd etc/
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ ls
rcS
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ mkdir init.d
mkdir: cannot create directory 'init.d': Permission denied
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ sudo mkdir init.d
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ touch inittab
touch: cannot touch 'inittab': Permission denied
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ sudo touch inittab
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$
```

```
Activities Terminal Feb 11 18:38
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc

adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1$ ls
bin etc lib linuxrc sbin usr var
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1$ cd etc/
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ ls
rcS
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ mkdir init.d
mkdir: cannot create directory 'init.d': Permission denied
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ sudo mkdir init.d
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ touch inittab
touch: cannot touch 'inittab': Permission denied
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$ sudo touch inittab
adhamwalaa@adhamwalaa-G3-3500: ~/embedded_linux_kitchen/qemu/root1/etc$
```

Final output:

If the user presses 1:

```
Welcome to the initramfs shell!
Type '1' to mount and switch to the root filesystem on /dev/mmcblk0p2 (second partition).
Type '2' to mount and switch to the root filesystem on /dev/mmcblk0p3 (third partition).
Type '3' to exit this loop and drop to a shell.
initramfs> input: ImEXPS/2 Generic Explorer Mouse as /devices/platform/bus@40000000/bus@40000000:motherboard-bus@40000000/bus@40000000:motherboard-bus@40000000:iofpga@00000000/10007000.kni/serial/input/input1
drm-clcd-pl111 10020000.clcd: DVI muxed to daughterboard 1 (core tile) CLCD
drm-clcd-pl111 10020000.clcd: initializing Versatile Express PL111
input: AT Raw Set 2 keyboard as /devices/platform/bus@40000000/bus@40000000:motherboard-bus@40000000:motherboard-bus@40000000:iofpga@7,00000000/10006000.kni/serial/input/input2
drm-clcd-pl111 10020000.clcd: DVI muxed to daughterboard 1 (core tile) CLCD
drm-clcd-pl111 10020000.clcd: initializing Versatile Express PL111

Invalid input. Please type '1', '2', or '3'.
initramfs> 1
Mounting root filesystem from /dev/mmcblk0p2...
EXT4-fs (mmcblk0p2): mounted filesystem 52344936-6f28-403c-b78c-3adc8c019d7e r/w with ordered data mode. Quota mode: disabled.
Root filesystem mounted successfully!
Switching to new root...
random: crng init done

Please press Enter to activate this console. drm-clcd-pl111 10020000.clcd: DVI muxed to daughterboard 1 (core tile) CLCD
drm-clcd-pl111 10020000.clcd: initializing Versatile Express PL111
```

```
Mounting root filesystem from /dev/mmcblk0p2...
EXT4-fs (mmcblk0p2): mounted filesystem 52344936-6f28-403c-b78c-3adc8c019d7e r/w with ordered data mode. Quota mode: disabled.
Root filesystem mounted successfully!
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```
Please press Enter to activate this console. drm-clcd-pl111 10020000.clcd: DVI muxed to daughterboard 1 (core tile) CLCD
drm-clcd-pl111 10020000.clcd: initializing Versatile Express PL111
amba 1000f000.wdt: deferred probe pending
amba 10020000.clcd: deferred probe pending
amba 100e0000.memory-controller: deferred probe pending
amba 100e1000.memory-controller: deferred probe pending
amba 100e5000.watchdog: deferred probe pending
i2c 0-0039: deferred probe pending
```

```
/bin/sh: can't access tty; job control turned off
```

```
~ #
```

```
~ #
```

```
~ #
```

```
~ # ls
```

```
bin      etc      new_root  sbin     tmp      var
```