

# History

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itzroma@itzroma-VirtualBox: ~/repos/busybox

itzroma@itzroma-VirtualBox:~/repos/busybox$ history
 1 sudo apt update
 2 sudo apt upgrade
 3 sudo apt install git vim vim-gtk tree curl
 4 sudo apt install ccache
 5 ccache -M 5G
 6 ccache -s
 7 ccache -C
 8 tree ~/.ccache
 9 cd Downloads/
10 ls
11 sudo tar xJvf gcc-arm-8.3-2019.03-x86_64-arm-eabi.tar.xz -C /opt/
12 sudo tar xJvf gcc-arm-8.3-2019.03-x86_64-arm-linux-gnueabi.tar.xz -C /opt/
13 cd
14 sudo apt install make libncurses5-dev libssl-dev bc bison flex
15 mkdir ~/repos
16 cd ~/repos/
17 git clone https://gitlab.denx.de/u-boot/u-boot.git
18 cd u-boot/
19 git checkout v2019.01
20 git revert --no-edit d30ba2315ae3
21 export PATH=/opt/gcc-arm-8.3-2019.03-x86_64-arm-eabi/bin:$PATH
22 export CROSS_COMPILE='ccache arm-eabi-'
23 export ARCH=arm
24 make am335x_boneblack_defconfig
25 make -j4
26 ls
27 cd ~/re
28 cd ~/repos/
29 git clone git://git.kernel.org/pub/scm/linux/kernel/git/stable/linux-stable.git
30 git clone git://git.busybox.net/busybox
31 sudo apt install qemu-system-arm
32 sudo apt install qemu-system-arm
33 cd linux-stable/
34 git checkout linux-4.19.y
35 export PATH=/opt/gcc-arm-8.3-2019.03-x86_64-arm-eabi/bin:$PATH
36 export CROSS_COMPILE='ccache arm-eabi-'
37 export ARCH=arm
38 mkdir fragments
39 gedit fragments/bbb.cfg
40 ./scripts/kconfig/merge_config.sh arch/arm/configs/multi_v7_defconfig fragments/bbb.cfg
41 make -j4 zImage modules am335x-boneblack.dtb
42 ls arch/arm/boot/
43 ls dts/
44 ll
45 ls arch/arm/boot/dts/
46 cd ../busybox/
47 git checkout 1_31_stable
48 export ARCH=arm
49 export PATH=/opt/gcc-arm-8.3-2019.03-x86_64-arm-linux-gnueabi/bin:$PATH
50 export CROSS_COMPILE="ccache arm-linux-gnueabi-"
51 make defconfig
52 make -j4
53 make install
54 mkdir -p _install/{boot,dev,etc}/init.d,lib,proc,root,sys/kernel/debug,tmp}
55 gedit _install/etc/init.d/rcS
56 chmod +x _install/etc/init.d/rcS
57 ln -s bin/busybox _install/init
58 cd _install/boot/
59 cp ~/repos/linux-stable/arch/arm/boot/zImage .
60 cp ~/repos/linux-stable/arch/arm/boot/dts/am335x-boneblack.dtb .
61 cp ~/repos/linux-stable/System.map .
62 cp ~/repos/linux-stable/.config ./config
63 cd -
64 cd ~/repos/linux-stable/
65 export INSTALL_MOD_PATH=~/repos/busybox/_install
66 export ARCH=arm
67 make modules_install
68 cd -
69 ${CROSS_COMPILE}readelf -d _install/bin/busybox | grep NEEDED
70 cd _install/lib
71 libc_dir=${${CROSS_COMPILE}gcc -print-sysroot}/lib
72 cp -a $libc_dir/*.so* .
73 cd -
74 echo '$MODALIAS=. * root:root 660 @modprobe "$MODALIAS"' > _install/etc/mdev.conf
75 echo 'root:x:0:' > _install/etc/group
76 echo 'root:x:0:0:root:/root:/bin/sh' > _install/etc/passwd
77 echo 'root:10933:0:99999:7:::' > _install/etc/shadow
78 echo 'nameserver 8.8.8.8' > _install/etc/resolv.conf
79 cd _install/
80 find . | cpio -o -H newc | gzip > ../rootfs.cpio.gz
81 cd ..
82 qemu-system-arm -kernel _install/boot/zImage -initrd rootfs.cpio.gz -machine virt -nographic -m 512 --append "root=/dev/ram0 rw console=ttyAMA0,115200 mem=512M"
83 history
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# QEMU console

```
ltzroma@ltzroma-VirtualBox: ~/repos/busybox
Please press Enter to activate this console.
/ #
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/ # uname -a
Linux (none) 4.19.265 #1 SMP Thu Nov 17 12:33:22 EET 2022 armv7l GNU/Linux
/ # ls -l
total 0
drwxrwxr-x 2 1000 1000 0 Nov 17 10:56 bin
drwxrwxr-x 2 1000 1000 0 Nov 17 10:59 boot
drwxrwxr-x 3 1000 1000 0 Nov 17 11:04 dev
drwxrwxr-x 3 1000 1000 0 Nov 17 11:02 etc
lrwxrwxrwx 1 1000 1000 11 Nov 17 10:58 init -> bin/busybox
drwxrwxr-x 3 1000 1000 0 Nov 17 11:01 lib
lrwxrwxrwx 1 1000 1000 11 Nov 17 10:56 linuxrc -> bin/busybox
dr-xr-xr-x 90 root root 0 Jan 1 1970 proc
drwxrwxr-x 2 1000 1000 0 Nov 17 10:56 root
drwxrwxr-x 2 1000 1000 0 Nov 17 10:56/sbin
dr-xr-xr-x 12 root root 0 Nov 17 11:04 sys
drwxrwxr-x 2 1000 1000 0 Nov 17 10:56 tmp
drwxrwxr-x 4 1000 1000 0 Nov 17 10:56 usr
/ # dmesg | grep init
[ 0.000000] Memory: 486416K/524288K available (12288K kernel code, 1610K rwdata, 4788K rodata, 2048K init, 395K bss, 52336K reserved, 65536K cma-reserved, 0K highmem)
[ 0.000000] .init : 0x(ptrval) - 0x(ptrval) (2048 KB)
[ 0.511508] devtmpfs: initialized
[ 0.689063] pinctrl core: initialized pinctrl subsystem
[ 0.959141] SCSI subsystem initialized
[ 1.322577] Trying to unpack rootfs image as initramfs...
[ 4.261833] Freeing initrd memory: 25104K
[ 4.818897] SuperH (H)SCI(F) driver initialized
[ 4.820560] msm_serial: driver initialized
[ 4.820986] STMicroelectronics ASC driver initialized
[ 4.823039] STM32 USART driver initialized
[ 11.593749] Run /init as init process
/ # busybox --help | head -15
BusyBox v1.31.2 (2022-11-17 12:54:07 EET) multi-call binary.
BusyBox is copyrighted by many authors between 1998-2015.
Licensed under GPLv2. See source distribution for detailed
copyright notices.

Usage: busybox [function [arguments]...]
or: busybox --list[-full]
or: busybox --show SCRIPT
or: busybox --install [-s] [DIR]
or: function [arguments]...

BusyBox is a multi-call binary that combines many common Unix
utilities into a single executable. Most people will create a
link to busybox for each function they wish to use and BusyBox
will act like whatever it was invoked as.

/ # poweroff
/ # umount: can't unmount /: Invalid argument
swapoff: can't open '/etc/fstab': No such file or directory
The system is going down NOW!
```