Application Notes

Linux 3.10.33 Package Release Note
Revision 0.10

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distribution.

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Revision History

Revision	Date	Author	Changes
0.1	Nov 28, 2013	Matthew Shyu	Initial draft
0.2	Jan 9, 2013	Matthew Shyu	Update nand programming procedure
0.3	Mar 13, 2013	Mingyen Hung	Update to match kernel 3.10.10
0.4	Apr 28, 2014	Matthew Shyu	Include QT5 and X and update package list
0.5	May 27, 2014	Matthew Shyu	For 201405 release
0.6	Jun 18, 2014	Matthew Shyu	For 201406 release. Add QT 5.2.1
0.7	Jun 25, 2014	Jerry Cao	Update 3.1 List of Supported Boards to add CPU and DDR configuration for the current supported boards.
0.8	Jun 27, 2014	Matthew Shyu	Update the version of supported packages and add information on toolchain used.
0.9	Aug 26, 2014	Matthew Shyu	Update to gnueabihf compiler, add 201408 release and secure os instructions
0.10	Jan 20, 2015	Matthew Shyu	Update the version of supported packages

1. Overview

This document describes the packages and features that are supported in Amlogic Linux platforms.

It includes:
- Chapter 1: Supported Packages
- Chapter 2: Supported Boards
- Chapter 3: Linux Building and Installation Procedures
- Appendix A: Wi-Fi Enabling Procedures
- Appendix B: GStreamer Test Procedures
- Appendix C: Libplayer Test Procedures
- Appendix D: Mali and QT5 Test Procedures
- Appendix E: Secure OS

2. Chapter 1: Supported Packages

Amlogic adopts Buildroot as package management system.   See http://buildroot.uclibc.org/ for more details on how it works.

2.1 List of Supported Package

Package	Version	Description
acl	2.2.52	
alsa-lib	1.0.28	ALSA User space library. See http://www.alsa-project.org/
alsa-utils	1.0.28	Command line utilities for the ALSA. See http://www.alsa-project.org/
aml_libs		Amlogic video/audio decoder
aml_customer		Amlogic Linux customer board configurations
aml_nand		Amlogic Nand driver
aml_uboot_customer		Amlogic Uboot customer configurations
aml_pmu		Amlogic PMU driver
aml_tvin		Amlogic TVIN driver
aml_util	0.1	Utilities
atk	2.14.0	Accessibility Toolkit. See https://developer.gnome.org/atk/
attr	2.4.47	Commands for Manipulating Filesystem Extended Attributes. See http://savannah.nongnu.org/projects/attr
blackbox	0.70.1	Window manager. See http://sourceforge.net/projects/blackboxwm/
boost	1.56.0	Set of libraries for C++. See http://www.boost.org/
brcmap6xxx		Broadcom wifi driver
brcmusi		Broadcom usi dhd driver
busybox	1.22.1	Tiny versions of many common UNIX utilities. See http://www.busybox.net/
cairo	1.12.12	2D graphics library. See http://cairographics.org
cjson	58	ANSI-C compliant JSON parser. See http://sourceforge.net/projects/cjson/
dbus	1.8.10	Message bus system. See http://www.freedesktop.org/wiki/Software/dbus/
dhcpcd	6.4.7	DHCP client daemon. See http://roy.marples.name/projects/dhcpcd/wiki
directfb	1.6.3	Graphics library. See http://www.directfb.org/
e2fsprogs	1.42.12	Filesystem utilities for use with the ext2/3/4 filesystem. See http://e2fsprogs.sourceforge.net/
enchant	1.6.0	Generic interface for spell checking libraries. See http://www.abisource.com/
enlightenment	0.17.3	window manager. See https://www.enlightenment.org/
eudev	1.9	A replacement for udev. See

		https://github.com/gentoo/eudev
expat	2.1.0	Library for parsing XML written in C. See http://expat.sourceforge.net/
fbdump	0.4.2	Tools to captures the contents of framebuffer device. See http://www.rcdrummond.net/fbdump/
fbgrab	1.2	Framebuffer screenshot program. See http://freecode.com/projects/fbgrab
fbterm	1.7.0	Framebuffer based terminal emulator. See http://code.google.com/p/fbterm/
fb-test-app	rosetta-1.1.0	Test suite for Linux framebuffer. See https://github.com/prpplague/fb-test-app
fontconfig	2.11.1	Font configuration and customization library. See http://www.freedesktop.org/wiki/Software/fontconfig/
freetype	2.5.3	Fonts rendering library. See http://www.freetype.org
gdb	7.7.1	GNU debugger. See https://www.gnu.org/software/gdb/
gdk-pixbuf	2.30.8	See https://developer.gnome.org/gdk-pixbuf/stable/
glib-networking	2.36.2	See https://git.gnome.org/browse/glib-networking/
gmp	6.0.0a	Library for arbitrary precision arithmetic. See https://gmplib.org/
gnutls	3.2.20	Transport Layer Security Library. See http://www.gnutls.org/.
gpu		Amlogic Mali gpu driver
gst-aml-plugin	0.11.0	Amlogic Gstreamer plugin
gst-app	0.11.0	Gstreamer app. See http://gstreamer.freedesktop.org
gst-fluendo-mpegdemux	0.10.72	Fluendo plugin. See http://core.fluendo.com/gstreamer
gst-plugins-bad	0.10.23	Gstreamer bad set. See http://gstreamer.freedesktop.org/modules/gst-plugins-bad.html
gst-plugins-base	0.10.36	See http://gstreamer.freedesktop.org/modules/gst-plugins-base.html
gst-plugins-good	0.10.31	See http://gstreamer.freedesktop.org/modules/gst-plugins-good.html
gst-plugins-ugly	0.10.19	See http://gstreamer.freedesktop.org/modules/gst-plugins-ugly.html
gstreamer	0.10.36	Gstreamer. See http://gstreamer.freedesktop.org/
harfbuzz	0.9.22	Opentext shaping engine. See http://www.freedesktop.org/wiki/Software/HarfBuzz/
hwdata	0.230	See https://fedorahosted.org/hwdata/.
icu	51.2	International Components for Unicode. See

		http://site.icu-project.org/
iw	3.17	nl80211 based utility for wireless devices. See http://wireless.kernel.org/en/users/Documentation/iw
kmod	18	Kernel module tools. See https://www.kernel.org/pub/linux/utils/kernel/kmod/
libcurl	7.39.0	Multiprotocol file transfer library. See http://c-ares.haxx.se/
libdrm	2.4.58	See http://www.linuxfromscratch.org/blfs/view/svn/x/libdrm.html
libecore	1.7.10	Enlightenment foundation libarary.
libedbus	1.7.10	Enlightenment foundation libarary.
libedje	1.7.10	Enlightenment foundation libarary.
libeet	1.7.10	Enlightenment foundation libarary.
libefreet	1.7.10	Enlightenment foundation libarary.
libeina	1.7.10	Enlightenment foundation libarary.
libeio	1.7.10	Enlightenment foundation libarary.
libembryo	1.7.10	Enlightenment foundation libarary.
libevas	1.7.10	Enlightenment foundation libarary.
libevas-generic-loaders	1.7.10	Enlightenment foundation libarary.
libevent	1.7.10	Enlightenment foundation libarary.
libffi	3.1	Event notification library. See http://libevent.org/
libgail	1.22.3	Foreign Function Interface Library. See http://sourceware.org/libffi/
libglib2	2.42.0	See https://developer.gnome.org/glib/
libgtk2	2.24.18	Core library for GTK+, GNOME. See http://www.gtk.org/.
libid3tag	0.15.1b	See http://sourceforge.net/projects/mad/files/libid3tag/
libjpeg	9a	Jpeg library. See http://libjpeg.sourceforge.net/
libmad	0.15.1b	MPEG audio decoder. See http://sourceforge.net/projects/mad/
libnl	3.2.25	Libraries for netlink protocol. See http://www.infradead.org/~tgr/libnl/doc/api/
libplayer	2.1.0	Amlogic media player library
libpng	1.6.15	PNG reference library. See http://www.libpng.org/pub/png/libpng.html
librsvg	2.26.3	SVG rendering library. See http://librsvg.sourceforge.net/download/
libsecret	0.15	See https://developer.gnome.org/libsecret/unstable/
libsexy	0.1.11	A collection of GTK+ widgets. See http://www.ohloh.net/p/libsexy
libsoup	2.43.1	HTTP client/server library for GNOME. See https://developer.gnome.org/libsoup/

libxcb	1.11	X protocol C binding. See http://xcb.freedesktop.org/.
libxkbcommon	0.3.0	See http://xcb.freedesktop.org/
libxml2	2.9.2	XML toolkit. See http://xmlsoft.org/
libxslt	1.1.28	XSLT support for libxml2. See http://xmlsoft.org/XSLT/
linux-amlogic	3.10.33	Amlogic Linux kernel
lua	5.1.5	See http://www.lua.org/
mali_examples	2.0.0.9444	Mali OpenGL ES examples. See http://malideveloper.arm.com/cn/develop-for-mali/sdks/opengl-es-sdk-for-linux/
mplayer	1.1.1	See http://www.mplayerhq.hu/design7/news.html.
ncureses	5.9	New curses library. See http://www.gnu.org/software/ncurses/
nettle	2.7.1	Crypto library. See http://www.lysator.liu.se/~nisse/nettle/.
ntp	4.2.6p5	See http://www.ntp.org/.
openssl	1.0.1j	Cryptography library. See http://www.openssl.org/
pango	1.36.7	Library for layout and rendering of text. See http://www.pango.org/
pcre	8.36	Perl compatible regular expression. See http://www.pcre.org/.
pixman	0.32.6	Low-level pixel manipulation library. See http://www.pixman.org/
qt5base	5.3.2	Cross-platform application and UI framework. See http://qt-project.org/
qt5declarative	5.3.2	See http://qt-project.org/
qt5graphicaleffects	5.3.2	See http://qt-project.org/
qt5imageformats	5.3.2	See http://qt-project.org/
qt5multimedia	5.3.2	See http://qt-project.org/
qt5quick1	5.3.2	See http://qt-project.org/
qt5quickcontrols	5.3.2	See http://qt-project.org/
qt5script	5.3.2	See http://qt-project.org/
qt5sensors	5.3.2	See http://qt-project.org/
qt5serialport	5.3.2	See http://qt-project.org/
qt5svg	5.3.2	See http://qt-project.org/
qt5webkit	5.3.2	See http://qt-project.org/
qt5xmlpatterns	5.3.2	See http://qt-project.org/
remotecfg	1.0.0	Amlogic remote configuration tool
rtk8188eu		Realtek 8188EU driver
rtk8192cu		Realtek 8192CU driver
rtk8192du		Realtek 8192DU driver
rtk8192eu		Realtek 8192EU driver
rtk8189es		Realtek 8189ES driver
rtk8723au		Realtek 8723AU driver

rtk8723bs		Realtek 8723AU driver
sqlite	3080701	SQL database engine. See http://www.sqlite.org/
tslib	1.1	Abstraction layer for touchscreen panel events. See http://tslib.berlios.de/
uboot		Amlogic uboot
ump_userspace_drv		ARM UMP userspace driver
util-linux	2.25.2	Essential utilities for Linux. See https://www.kernel.org/pub/linux/utils/util-linux/
wavpack	4.70.0	Open audio codec. See http://www.wavpack.com/
webkit	1.11.5	See http://www.webkit.org/.
webp	0.3.1	See https://developers.google.com/speed/webp/?csw=1.
wpa_supplicant	2.3	See http://hostap.epitest.fi/wpa_supplicant/
wifi-fw		Wifi DSP firmware
xapp_xclock	1.0.7	See http://www.x.org/archive/X11R7.5/doc/man/man1/xclock.1.html
xapp_xdpyinfo	1.3.1	See http://www.x.org/archive/current/doc/man/man1/xdpyinfo.1.xhtml
xapp_xkbcomp	1.2.4	See http://www.x.org/archive/X11R6.8.1/doc/xkbcomp.1.html
xapp_xlogo	1.0.4	See http://www.x.org/archive/X11R7.5/doc/man/man1/xlogo.1.html.
xcb-proto	1.11	See http://xcb.freedesktop.org/.
xcb-util	0.3.9	See http://xcb.freedesktop.org/.
xcb-util-image	0.3.9	See http://xcb.freedesktop.org/.
xcb-util-keysyms	0.3.9	See http://xcb.freedesktop.org/.
xcb-util-wm	0.3.9	See http://xcb.freedesktop.org/.
xdata_xbitmaps	1.1.1	See http://www.x.org/wiki/.
xdriver_xf86-input-evdev	2.8.2	See http://cgit.freedesktop.org/xorg
xdriver_xf86-input-keyboard	1.8.0	See http://cgit.freedesktop.org/xorg
xdriver_xf86-input-mouse	1.9.0	See http://cgit.freedesktop.org/xorg
xdriver_xf86-video-fbturbo	master	See https://github.com/ssvb/xf86-video-fbturbo
xdriver_xf86-video-mali		See http://malideveloper.arm.com/develop-for-mali/drivers/open-source-mali-gpus-linux-exadri2-and-x11-display-drivers/

xfont_encodings	1.0.4	See http://cgit.freedesktop.org/xorg/lib/libXfont/
xfont_font-alias	1.0.3	See http://cgit.freedesktop.org/xorg/lib/libXfont/
xfont_font-cursor-misc	1.0.3	See http://cgit.freedesktop.org/xorg/lib/libXfont/
xfont_font-misc-misc	1.1.2	See http://cgit.freedesktop.org/xorg/lib/libXfont/
xfont_font-util	1.3.0	See http://cgit.freedesktop.org/xorg/lib/libXfont/
xkeyboard-config	2.10.1	See http://www.freedesktop.org/wiki/Software/XKeyboardConfig/
xlib_libfontenc	1.1.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libICE	1.0.9	See http://cgit.freedesktop.org/xorg/lib/
xlib_libpciaccess	0.13.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libpthread-stubs	0.3	See http://cgit.freedesktop.org/xorg/lib/
xlib_libSM	1.2.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libX11	1.6.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXau	1.0.8	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXaw	1.0.12	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXcomposite	0.4.4	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXcursor	1.1.14	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXdamage	1.1.4	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXdmcp	1.1.1	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXext	1.3.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXfixes	5.0.1	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXfont	1.5.0	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXft	2.3.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXi	1.7.4	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXinerama	1.1.3	See http://cgit.freedesktop.org/xorg/lib/
xlib_libxkbfile	1.0.8	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXmu	1.1.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXpm	3.5.11	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXrandr	1.4.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXrender	0.9.8	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXres	1.0.7	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXt	1.1.4	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXtst	1.2.2	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXv	1.0.10	See http://cgit.freedesktop.org/xorg/lib/
xlib_libXxf86vm	1.1.3	See http://cgit.freedesktop.org/xorg/lib/
xlib_xtrans	1.3.4	See http://cgit.freedesktop.org/xorg/lib/
xproto_bigreqsproto	1.1.2	See http://cgit.freedesktop.org/xorg/proto
xproto_compositeproto	0.4.2	See http://cgit.freedesktop.org/xorg/proto
xproto_damageproto	1.2.1	See http://cgit.freedesktop.org/xorg/proto

xproto_dri2proto	2.8	See http://cgit.freedesktop.org/xorg/proto
xproto_fixesproto	5.0	See http://cgit.freedesktop.org/xorg/proto
xproto_fontsproto	2.1.3	See http://cgit.freedesktop.org/xorg/proto
xproto_glproto	1.4.17	See http://cgit.freedesktop.org/xorg/proto
xproto_inputproto	2.3.1	See http://cgit.freedesktop.org/xorg/proto
xproto_kbproto	1.0.6	See http://cgit.freedesktop.org/xorg/proto
xproto_randrproto	1.4.0	See http://cgit.freedesktop.org/xorg/proto
xproto_recordproto	1.14.2	See http://cgit.freedesktop.org/xorg/proto
xproto_renderproto	0.11.1	See http://cgit.freedesktop.org/xorg/proto
xproto_resourceproto	1.2.0	See http://cgit.freedesktop.org/xorg/proto
xproto_videoproto	2.3.2	See http://cgit.freedesktop.org/xorg/proto
xproto_xcmiscproto	1.2.2	See http://cgit.freedesktop.org/xorg/proto
xproto_xextproto	7.3.0	See http://cgit.freedesktop.org/xorg/proto
xproto_xf86bigfontproto	1.2.0	See http://cgit.freedesktop.org/xorg/proto
xproto_xf86dgaproto	2.1	See http://cgit.freedesktop.org/xorg/proto
xproto_xf86driproto	2.1.1	See http://cgit.freedesktop.org/xorg/proto
xproto_xf86vidmodeproto	2.3.1	See http://cgit.freedesktop.org/xorg/proto
xproto_xineramaproto	1.2.1	See http://cgit.freedesktop.org/xorg/proto
xproto_xproto	7.0.26	See http://cgit.freedesktop.org/xorg/proto
xserver_xorg-server	1.16.1	X Window system. See http://www.x.org/wiki/
xterm	306	Terming emulator. See http://invisible-island.net/xterm/
xutil_util-macros	1.19.0	See http://cgit.freedesktop.org/xorg/util/macros
zlib	1.2.8	Data compression library. See http://www.zlib.net/

3. Chapter 2: Supported Boards

This chapter lists the reference boards that Amlogic currently supports.

3.1 List of Supported Boards

Amlogic supports the following reference boards, namely g18, g35 k200, m200, m201 and n200 with Linux kernel 3.10.33. This section lists the features and peripherals for these boards.

G18:

- Amlogic 8726-M6 CPU
- 1GB DDR3
- HDMI out x 1
- TF Card x 1
- Ethernet x 1
- SDIO Wifi/BT (8192cu) x 1
- ADC key x 1
- YPbPr out x 1
- SPDIF (coaxial) x 1
- USB hub x 1
- USB otg x 1
- SPI & Nand x 1
- 1GB DDR3

G35:

- Amlogic 8726-M6 CPU
- 1GB DDR3
- HDMI out x 1
- TF Card x 1
- SDIO Wifi (brcm 40183) x 1
- USB hub x 1
- USB otg x 1
- SPI & Nand x 1

K200-B:

- Amlogic S802 CPU
- 1GB DDR3
- HDMI out x 1
- TF Card x 1

- Ethernet x 1
- USB Wifi/BT (8188eu) x 1
- ADC key x 1
- CVBS out x 1
- SPDIF (coaxial) x 1
- USB hub x 1
- USB otg x 1
- SPI & eMMC x 1

M201:

- Amlogic S805 CPU
- 1GB DDR3
- HDMI out x 1
- TF Card x 1
- Ethernet x 1
- USB Wifi/BT (AP6210) x 1
- USB hub x 1
- eMMC x 1

M200:

- Amlogic S805 CPU
- 1GB DDR3
- HDMI out x 1
- TF Card x 1
- Ethernet x 1
- USB Wifi/BT (AP6210) x 1
- USB port x 2
- eMMC x 1
- VGA x 1

N200:

- Amlogic S812 CPU
- 2GB DDR3
- HDMI out x 1
- TF Card x 1
- Ethernet x 1
- USB Wifi/BT (AP6234) x 1
- ADC key x 1

- CVBS out x 1
- SPDIF (coaxial) x 1
- USB hub x 1
- USB otg x 1
- VGA x 1

4. Chapter 3: Linux Compilation and Installation Procedures

4.1 Toolchains

Two sets of toolchains are used in the compilation.

The first one is used for compiling kernel and applications and it is automatically download from Linaro's website by Buildroot. The path is shown below just for completeness.

http://releases.linaro.org/14.05/components/toolchain/binaries/gcc-linaro-arm-linux-gnueabihf-4.9-2014.05_linux.tar.xz †

The second set of toolchains is used for compiling uboot and it can be downloaded from Amlogic OpenLinux website through

wget -c http://openlinux.amlogic.com:8000/deploy/CodeSourcery.tar.gz
wget -c http://openlinux.amlogic.com:8000/deploy/gnutools.tar.gz
wget -c http://openlinux.amlogic.com:8000/deploy/arc-4.8-amlogic-20130904-r2.tar.gz

Extract and put them into search path.

$ tar zxf CodeSourcery.tar.gz -C /opt
$ tar zxf gnutools.tar.gz -C /opt
$ tar zxf arc-4.8-amlogic-20130904-r2.tar.gz -C /opt
$ export PATH=$PATH:
/opt/gnutools/arc2.3-p0/elf32-4.2.1/bin:/opt/gnutools/arc2.3-p0/uclibc-4.2.1/bin:/opt/arc-4.8-amlogic-20130904-r2/bin: /opt/CodeSourcery/Sourcery_G+
+_Lite/bin:/opt/CodeSourcery/Sourcery_G+
+_Lite/arm-none-eabi/bin:/opt/CodeSourcery/Sourcery_G+
+_Lite/arm-none-linux-gnueabi/bin

†Note: Hard float compiler is used for better performance. If you would like to switch back to soft float compiler for some reasons, such as, for backward compatible with legacy applications. Make the following changes to your configuration files.
-#BR2_TOOLCHAIN_EXTERNAL_LINARO_ARM201204=y

-BR2_TOOLCHAIN_EXTERNAL_LINARO_2014_02=y
-BR2_ARM_EABIHF=y
+BR2_TOOLCHAIN_EXTERNAL_LINARO_ARM201204=y
+#BR2_TOOLCHAIN_EXTERNAL_LINARO_2014_02=y
+#BR2_ARM_EABIHF=y
-BR2_TARGET_ROOTFS_INITRAMFS_LIST="board/amlogic/meson_g18/initramfs/ramfs list-hf"
+BR2_TARGET_ROOTFS_INITRAMFS_LIST="board/amlogic/meson_g18/initramfs/ramf slist"

4.2 Compiling the System

Getting the source code:
$ wget -c
http://openlinux.amlogic.com:8000/download/ARM/filesystem/arm-buildroot-2015-01-20-4a5990f135.tar.gz

Compilation:
$ tar zxvf arm-buildroot-2015-01-20-4a5990f135.tar.gz
$ cd buildroot
$ make meson8_k200b_release_defconfig # For k200B boards
$ make meson6_3.10_g18_release_defconfig # For g18 boards
$ make meson6_3.10_g35_release_defconfig # For g35 boards
$ make meson8b_m201_release_defconfig # For m201 boards
$ make meson8b_m200_release_defconfig # For m200 boards
$ make meson8m2_n200_release_defconfig # For n200 boards
$ make meson8_k200b_x_release_defconfig # For k200B boards with X server
$ make meson6_3.10_g18_x_release_defconfig # For g18 boards with X server
$ make meson8b_m201_x_release_defconfig # For m201 boards with X server
$ make meson8b_m200_x_release_defconfig # For m200 boards with X server
$ make meson8m2_n200_x_release_defconfig # For n200 boards with X server
$ make
Note: Do not use make -jN here as Buildroot does not support top-level parallel make. This does not mean that Buildroot does not support parallel compilation, but just that it will handle this inside the Buildroot compilation system.

4.3 Installing Linux on SD Cards

The following steps show how to install the resulting system on your SD card.
1. Create an SD card with one partition in ext2 format.
2. Copy u-boot.bin, boot.img, rootfs.tar.gz to this partition
        $ sudo cp output/images/u-boot.bin /media/sdcard

```
$ sudo cp output/images/boot.img /media/sdcard
$ sudo cp output/images/rootfs.tar.gz /media/sdcard
$ sync
```
3. Extract rootfs.tar.gz on SD card
```
$ cd /media/sdcard
$ sudo tar zxvf  rootfs.tar.gz
$ sync
```
4. Insert SD card into your platform and reboot it into uboot. Replace original uboot with the new one under uboot prompt:
```
# mmcinfo
# ext2load mmc 0 ${loadaddr} u-boot.bin
# store rom_write ${loadaddr} 0 60000
# reset
```
5. Enter uboot again, and execute "run bootsdcard" under the prompt:
```
# defenv
# saveenv
# run bootsdcard
```

4.4 Installing Linux on Nand Flash

Warning! All previous changes will be lost.

1. Create an SD card with one partition in vfat format
2. copy boot.img and root file system to SD card
```
$ cp output/images/u-boot.bin /media/mySD
$ cp output/images/boot.img /media/mySD
$ cp output/images/rootfs.tar.gz /media/mySD
```
   Insert SD card into your platform and reboot into uboot.
   Replace original uboot with the new one under uboot prompt:
```
# mmcinfo
# fatload mmc 0 ${loadaddr} u-boot.bin
# store rom_write  ${loadaddr} 0 60000
# reset
```
3. With new uboot burned on your platform, enter uboot prompt again and execute "run bootupdate"
```
# defenv
# saveenv
# run bootupdate
```
4. System will automatically write kernel to boot partition and extract rootfs.tar.gz to system partition.
5. Reboot platform.

6. System will boot up with kernel and root filesystem on NAND.

Appendix A: Wi-Fi Enabling Procedures

The appendix describes procedures for enabling Wi-Fi on Amlogic Linux platform manually:

- Check module existence:

      # lsmod
      Module   Size Used by   Not tainted
      dhd   410618 0

  If not,

      # modprobe dhd

  Note: "dhd" is the driver module name for broadcomm WIFI module. This name may vary depends

           on different WIFI modules equipped on your platform.

- Set up /etc/wpa_supplicant.conf:
  Example:
  ctrl_interface=/var/run/wpa_supplicant
  ctrl_interface_group=0
  ap_scan=1

      network={
          ssid="myAP"
          pairwise=CCMP TKIP
          group=CCMP TKIP
          proto=WPA RSN
          key_mgmt=WPA-PSK
          priority=5
          psk="my_passwd"
      }
- Restart wpa_supplicant:
  # /etc/init.d/S42wifi reload
  or enable wpa_supplicant directly:
  # wpa_supplicant -B -Dnl80211 -iwlan0 -c/etc/wpa_supplicant.conf
- Enable DHCP client:
  # dhcpcd

- Put your wpa_supplicant.conf under /board/amlogic/meson_XXX/rootfs/etc/ and regenerate your file system. Next time system will automatically enable Wi-Fi.
  Note: Modify meson_XXX according to your platform.
          For example: meson_g18 --> g18
                              meson_k200 --> k200

Appendix B: GStreamer Test Procedures

This appendix demonstrates how to use gplay to exercise Gstreamer. (For non-X platforms only)
I. Local file playback
   gplay mpeg.ts
II. Playing back a playlist
   gplay mpeg.ts 1080.mov
III. Network playback
   gplay http://131.107.149.211/test.files

gplay can take commands during playback.

[h]display the operation Help
[p]Play
[s]Stop
[e]Seek
[a]Pause/Play
[v]Volume
[m]Mute
[>]Play next file
[<]Play previous file
[r]Repeat mode
[f]Full screen
[z]resize the width and height
[t]Rotate
[c]Set play rate
[i]Display metadata
[x]eXit

Appendix C: Libplayer Test Procedures

This appendix demonstrates how to use kplayer to exercise Libplayer. (For non-X platforms only)
Usage: kplayer <file>
 0   show main menu
 a   start play
 s   get media info
 1   Pause play
 2   Resume play
 3   Stop play
 4   Fast forward
 5   Fast rewind
 6   Seek
 7   Set repeat
 8   Quit tools

Appendix D: Mali and QT5 Test Procedures

Leave Framebuffer sleep mode
echo 0 > /sys/class/graphics/fb0/blank

Mali examples: (For non-X platforms only)

There are a couple Mali execution examples under /usr/share/arm/OpenGL-ES-2.0
For example,
sh /etc/set_display_mode.sh
cd /usr/share/arm/OpenGL-ES-2.0/Cube
./Cube

QT5 examples:

QT5 demos are located under /usr/lib/qt/examples
For example,
sh /etc/set_display_mode.sh
cd /usr/lib/qt/examples/widgets/animation/animatedtiles
./animatedtiles (Note: use # ./animatedtiles -platform xcb under X)
cd /usr/lib/qt/examples/gui/openglwindow
./openglwindow

Appendix E: Secure OS

For authorized licensees only.

1. Secure OS BDK uses soft float architecture
   i.   To switch back to soft float compiler, see [section 4.1 Note](#)

2. extract your BDK package to package/aml_bdk/src

3. Add the following configurations to your config file
   i.   BR2_TARGET_UBOOT_WITH_SECURE_OS=y
   ii. BR2_PACKAGE_AML_BDK=y

4. Change your kernel and uboot profile, e.g.,
   i.   For kernel, from BR2_LINUX_KERNEL_DEFCONFIG="meson8" to BR2_LINUX_KERNEL_DEFCONFIG="meson8_tee"
   ii. For uboot, from BR2_TARGET_UBOOT_BOARDNAME="m8_k200_v1" to BR2_TARGET_UBOOT_BOARDNAME="m8_k200_v1_tee"

5. Install uboot-secureos.bin
   ```
   # mmcinfo
   # ext2load mmc 0 12000000 uboot-secureos.bin
   # store rom_write 12000000 0 100000
   # reset
   # defenv
   ```

6. Insert otz_client.ko
   ```
   # insmod /lib/modules/3.10.33/kernel/drivers/trustzone/otz_client.ko
   ```

7. run test apps, e.g.,
   ```
   #  otz_echo_client
   ```

‡P.S. The default TZO location is /system/lib, please change to /usr/lib, e.g.,
   i.   Change #define ECHO_FILE_PATH "/system/lib/echo.tzo"
        to #define ECHO_FILE_PATH "/usr/lib/echo.tzo"