User's Manual

Computer on Module

COM Ports Two USB Hosts LCD Ethernet SD

MXM-6410 Ubuntu Linux 9.04 (Jaunty

Jackalope) User's Manual v1.2



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MXM-6410/APC-6410 Ubuntu Linux (Jaunty Jackalope) Features

This Chapter gives an introduction to the Ubuntu Linux 9.04 features of MXM-6410 and APC-6410. Section include :

- Board Support Package (BSP)
- Drivers
- Services

Chapter 1 MXM-6410/APC-6410 Ubuntu Linux (Jaunty Jackalope) Features

Ubuntu 9.04 (as known as Jaunty Jackalope) is official released on April 23rd of 2009. And Embedian is one of the first few companies to support Ubuntu 9.04 for ARM11 processors. This Chapter gives an overall picture in regarding to the Ubuntu Linux 9.04 features that Embedian provided with for the MXM-6410 computer on module and APC-6410 single board computer.

1.1 Board Support Package (BSP)

The Embedian Board Support Package for Ubuntu Linux 9.04 is one of the most advanced BSPs available on the market. Beside the standard Ubuntu Linux functionality, it also includes a large number of additional drivers as well as optimized versions of standard drivers.

The Embedian Linux kernel is provided with a source code and binary format. This allows customers to customize the external device drivers themselves. With Ubuntu support, this relieves the application-developer from the burden of creating and building the own images. Instead the necessary adaptations can be done by using **apt-get** the software packages from the official Ubuntu 9.04 repository to the on-board root file system.

The BSP is available at Embedian FTP site at

ftp://ftp.embedian.com/pub/MXM-6410/Linux/.

Customers who follow the built instruction in the BSP folder will enable you to build exactly the same Linux kernel zImage as Embedian provides by default.

1.2 Drivers

The following drivers are integrated in the standard image that comes pre-installed with each MXM-6410 module or APC-6410 board.

Table 1.1 Drivers

Table 1.1	Drivers
Driver	Description
COM1	Support RXD/TXD/CTS/RTS
COM2	Support RXD/TXD
СОМЗ	Support RXD/TXD
COM4	External UART that supports the full RS232 specification with all 9 signals.
COM5	External UART that supports the full RS232 specification with all 9 signals.
Ethernet	10/100Mbit driver for Davicom DM9000B
USB Host	4 Ports supporting mass storage devices (USB-stick, hard disc, CD-ROM) and other devices as keyboard, mouse, USB hub
USB OTG	Client, TBS
Audio	16Bit stereo output (up to 48kHz), mic input, line-In supports ALSA standards
Touch Screen	All 4-wire resistive screens supported
Display	All types of displays supported. Use fbset utility to configure different resolutions and panels.
SD/SDHC	Memory cards, Wireless LAN, Bluetooth, GSM, GPS
CF	Memory cards, Wireless LAN, modem, Bluetooth, serial card, GPS, GSM,
GPIO	12 Configurable GPIO with Sample codes.
Flash File System	Ext3 is default supported
2D Engine	CPU 2D acceleration h/w supported
3D Engine	Support CPU 3D h/w acceleration. Support OpenGLES 1.1/2.0.
TV-Out	TV output driver for NTSC/PAL format is supported
Camera	Camera drivers for various camera modules
MFC Engine	Support h/w H.263, H.264, VC1
SPI	High speed SPI supported
RTC	Real time clock driver

1.3 Default Software Packages

Users can use *dpkg-query -W* to visualize the list of installed packages or *dpkg –I* to obtain the description of the set of installed packages. User can add their application oriented packages from the Ubuntu repository by using *apt-get install <Package Name>* as well.

Package Name	Version
acct	6.4~pre1-6ubuntu1
acl	2.2.47-2
adduser	3.110ubuntu5
alsa-base	1.0.18.dfsg-1ubuntu8
alsa-utils	1.0.18-1ubuntu11
apt	0.7.20.2ubuntu6
apt-utils	0.7.20.2ubuntu6
aptitude	0.4.11.11-1ubuntu1
arj	3.10.22-6
aspell	0.60.6-1
aspell-en	6.0-0-5.1
autoconf	2.63-2ubuntu1
base-files	5ubuntu4
base-passwd	3.5.21
bash	3.2-5ubuntu1
binutils	2.19.1-0ubuntu3
bsdmainutils	6.1.10ubuntu3
bsdutils	1:2.14.2-1ubuntu4
busybox-initramfs	1:1.10.2-2ubuntu7
bzip2	1.0.5-1ubuntu1
ca-certificates	20080809
conkeror	0.9~git080629-2
console-setup	1.28ubuntu8
console-terminus	4.26-2.1
consolekit	0.3.0-2ubuntu3
coreutils	6.10-6ubuntu1
сріо	2.9-15ubuntu1
срр	4:4.3.3-1ubuntu1
cpp-4.3	4.3.3-5ubuntu4

 Table 1.2 Default Software Packages

dash	0.5.4-12ubuntu2
dbus	1.2.12-0ubuntu2
dbus-x11	1.2.12-0ubuntu2
debconf-i18n	1.5.26ubuntu3
debianutils	2.30ubuntu3
debootstrap	1.0.12
defoma	0.11.10-0.2ubuntu1
desktop-file-utils	0.15-1ubuntu7
dhcp3-client	3.1.1-5ubuntu8
dhcp3-common	3.1.1-5ubuntu8
diff	2.8.1-12ubuntu1
dmsetup	2:1.02.27-4ubuntu5
docbook	4.5-4
docbook-dsssl	1.79-6
docbook-xml	4.5-6
docbook-xsl	1.73.2.dfsg.1-5
dpatch	2.0.30
dpkg	1.14.24ubuntu1
dpkg-dev	1.14.24ubuntu1
e2fslibs	1.41.4-1ubuntu1
e2fsprogs	1.41.4-1ubuntu1
eject	2.1.5+deb1+cvs20081104-5
esound-clients	0.2.40-0ubuntu3
esound-common	0.2.40-0ubuntu3
fakeroot	1.12.1ubuntu1
file	4.26-2ubuntu3
findutils	4.4.0-2ubuntu3
firefox	3.0.8+nobinonly-0ubuntu3
firefox-3.0	3.0.8+nobinonly-0ubuntu3
firefox-3.0-branding	3.0.8+nobinonly-0ubuntu3
fontconfig	2.6.0-1ubuntu12
fontconfig-config	2.6.0-1ubuntu12
gamin	0.1.9-2ubuntu4
gconf2	2.26.0-0ubuntu1
gconf2-common	2.26.0-0ubuntu1
language-pack-zh-base	1:9.04+20090413
laptop-detect	0.13.7ubuntu1

leafpad	0.8.13-1
less	418-1
lftp	3.7.8-1
libaa1	1.4p5-37build1
libacl1	2.2.47-2
libart	2.0
libasound2	1.0.18-1ubuntu9
libaspell15	0.60.6-1
libatk1.0-0	1.26.0
libatk1.0-data	1.26.0
libatm1	2.4.1-17.2
libattr1	1:2.4.43-1
libaudio2	1.9.1-5
libaudiofile0	0.2.6-7ubuntu1
libbeecrypt6	4.1.2-7
libblkid1	1.41.4-1ubuntu1
libbluetooth3	4.32-0ubuntu4
libbrlapi0.5	4.0~svn4301-0ubuntu4
libbz2	1.0 1.0.5
libc6	2.9-4ubuntu6
libc6-vfp	2.9
libcaca0	0.99.beta16-1
libcairo2 1.8.6	1ubuntu2
libcanberra0	0.11-1ubuntu5
libcap2	2.11-2
libcdparanoia0	3.10.2+debian -5
libck- connector0	0.3.0
libclass	accessor
libcomerr2	1.41.4-1ubuntu1
libcroco3	0.6.1-2
libcups2	1.3.9-17ubuntu1
libcurl3	7.18.2-8ubuntu4
libcurl3- gnutls	7.18.2
libcwidget3	0.5.12-4ubuntu1
libdatrie0	0.1.3-2
libdb4.6	4.6.21-12
libdb4.7	4.7.25-6ubuntu1

libdbus-1-3	1.2.12-0ubuntu2
libdbus-glib-1-2	0.80-3
libdevmapper1.02.1	2:1.02.27-4ubuntu5
libdirectfb-1.0-0	11.0.1-11ubuntu1
libdmx1	1:1.0.2-3
libdrm2	2.4.5-0ubuntu4
libdv4	1.0.0-1ubuntu2
libedit2	2.11~20080614-1ubuntu1
libenchant1c2a	1.4.2-3.3ubuntu1
libept0	0.5.26build1
libesd-alsa0	0.2.40-0ubuntu3
libexpat1	2.0.1-4
libfontconfig1	2.6.0-1ubuntu12
libfontenc1	1:1.0.4-3
libfreetype6	2.3.9-4build1
libfribidi0	0.10.9-1
libfs6	2:1.0.1-1
libgail-common	2.16.1-0ubuntu2
libgail18	2.16.1-0ubuntu2
libgamin0	0.1.9-2ubuntu4
libgcc1	1:4.3.3-5ubuntu4
libgconf2-4	2.26.0-0ubuntu1
libgcr0	2.26.1-0ubuntu1
libgcrypt11	1.4.1-2ubuntu1
libgdbm3	1.8.3-4
libgif4	4.1.6-6
libgksu2-0	2.0.9-1ubuntu3
libgl1-mesa-dri	7.4-0ubuntu3
libgl1-mesa-glx	7.4-0ubuntu3
libglade2-0	1:2.6.4-1
libglib2.0-0	2.20.1-0ubuntu2
libglib2.0-data	2.20.1-0ubuntu2
libgmp3c2	2:4.2.4+dfsg-2ubuntu1
libgnome-keyring0	2.26.1-0ubuntu1
libgnomecanvas2-0	2.26.0-0ubuntu1
libgnomecanvas2-common	2.26.0-0ubuntu1
libgnutls26	2.4.2-6

libgomp1	4.3.3-5ubuntu4
libgp11-0	2.26.1-0ubuntu1
libgpg-error0	1.4-2ubuntu7
libgpm2	1.20.4-3.1ubuntu1
libgsf-1-114	1.14.11-2ubuntu1
libgsf-1-common	1.14.11-2ubuntu1
libgtk2.0-0	2.16.1-0ubuntu2
libgtk2.0-bin	2.16.1-0ubuntu2
libgtk2.0-common	2.16.1-0ubuntu2
libgtop2-7	2.26.0-0ubuntu2
libgtop2-common	2.26.0-0ubuntu2
libhal-storage1	0.5.12~rc1+git20090403-0ubuntu1
libhal1	0.5.12~rc1+git20090403-0ubuntu1
libhunspell-1.2-0	1.2.6-1ubuntu2
libice6	2:1.0.4-1
libicu38	3.8.1-3ubuntu1
libidl0	0.8.13-0.1
libidn11	1.10-3
libio-string-perl	1.08-2
libjasper1	1.900.1-5.1
libjpeg-progs	6b-14
libjpeg62	6b-14
libkadm55	1.6.dfsg.4~beta1-5ubuntu2
libkeyutils1	1.2-9
libklibc	1.5.14-1~exp1ubuntu2
libkrb53	1.6.dfsg.4~beta1-5ubuntu2
liblcms1	1.18.dfsg-0ubuntu1
libIdap-2.4-2	2.4.15-1ubuntu3
liblircclient0	0.8.4a-0ubuntu5
liblocale-gettext-perl	1.05-4build1
liblockfile1	1.08-3
libltdl7	2.2.6a-1ubuntu1
libmagic1	4.26-2ubuntu3
libmng1	1.0.9-1
libmpfr1ldbl	2.4.0-1ubuntu3
libmysqlclient15off	5.1.30really5.0.75-0ubuntu10
libncurses5	5.7+20090207-1ubuntu1

libncursesw5	5.7+20090207-1ubuntu1
libneon27	0.28.2-6.1
libnewt0.52	0.52.2-11.3ubuntu3
libnotify1	0.4.5-0ubuntu1
libnspr4-0d	4.7.3-0ubuntu2
libnss3-1d	3.12.2~rc1-0ubuntu2
libobparser21	3.4.7.2-3
libobrender21	3.4.7.2-3
libogg0	1.1.3-4build1
liborbit2	1:2.14.17-0.1
libpam-ck-connector	0.3.0-2ubuntu3
libpam-gnome-keyring	2.26.1-0ubuntu1
libpam-modules	1.0.1-9ubuntu1
libpam-runtime	1.0.1-9ubuntu1
libpam0g	1.0.1-9ubuntu1
libpango1.0-0	1.24.1-0ubuntu1
libpango1.0-common	1.24.1-0ubuntu1
libpaper1	1.1.23+nmu1
libparse-debianchangelog-pe	1.1.1-2ubuntu1
rl	
libpcap0.8	1.0.0-1
libpci3	1:3.0.0-4ubuntu8
libpciaccess0	0.10.5-1
libpcre3	7.8-2ubuntu1
libpcrecpp0	7.8-2ubuntu1
libpixman-1-0	0.13.2-1
libpng12-0	1.2.27-2ubuntu2
libpolkit-dbus2	0.9-2ubuntu1
libpolkit-grant2	0.9-2ubuntu1
libpolkit2	0.9-2ubuntu1
libpopt0	1.14-4
libproxy0	0.2.3-0ubuntu5
libpulse0	1:0.9.14-0ubuntu20
libpython2.6	2.6.2-0ubuntu1
libqt4-dbus	4.5.0-0ubuntu4
libqt4-designer	4.5.0-0ubuntu4
libqt4-network	4.5.0-0ubuntu4

libqt4-qt3support	4.5.0-0ubuntu4
libqt4-script	4.5.0-0ubuntu4
libqt4-sql	4.5.0-0ubuntu4
libqt4-xml	4.5.0-0ubuntu4
libqtcore4	4.5.0-0ubuntu4
libqtgui4	4.5.0-0ubuntu4
librarian0	0.8.1-1ubuntu2
libreadline5	5.2-4
librpm4.4	4.4.2.3-2ubuntu1
librsvg2-2	2.26.0-0ubuntu1
librsvg2-common	2.26.0-0ubuntu1
libsasl2-2	2.1.22.dfsg1-23ubuntu3
libsasl2-modules	2.1.22.dfsg1-23ubuntu3
libsdl1.2debian-alsa	1.2.13-4ubuntu3
libselinux1	2.0.65-5build1
libsepol1	2.0.30-2ubuntu1
libsexy2	0.1.11-2
libsigc++-2.0-0c2a	2.0.18-2
libslang2	2.1.3-3ubuntu3
libsm6	2:1.1.0-1
libsmbclient	2:3.3.2-1ubuntu3
libsoup2.4-1	2.26.0-0ubuntu2
libsp1c2	1.3.4-1.2.1-47build1
libspeex1	1.2~rc1-1
libsqlite3-0	3.6.10-1
libss2	1.41.4-1ubuntu1
libssl0.9.8	0.9.8g-15ubuntu3
libstartup-notification0	0.9-1
libstdc++6	4.3.3-5ubuntu4
libsysfs2	2.1.0-5
libtalloc1	1.2.0~git20080616-1
libtasn1-3	1.5-1
libtdb1	1.1.3~git20081222-2build1
libtext-charwidth-perl	0.04-5build1
libtext-iconv-perl	1.7-1build1
libtext-wrapi18n-perl	0.06-6
libthai-data	0.1.9-4

libthai0	0.1.9-4
libtheora0	1.0-2
libtiff4	3.8.2-11
libtimedate-perl	1.1600-9
libts-0.0-0	1.0-4ubuntu2
libts-bin	1.0-4ubuntu2
libunique-1.0-0	1.0.8-0ubuntu1
libusb-0.1-4	2:0.1.12-13
libuuid1	1.41.4-1ubuntu1
libvdemgmt0	2.2.2-3ubuntu1
libvdeplug2	2.2.2-3ubuntu1
libvolume-id1	141-1
libvorbis0a	1.2.0.dfsg-3.1
libvorbisfile3	1.2.0.dfsg-3.1
libvte-common	1:0.20.0-0ubuntu2
libvte9	1:0.20.0-0ubuntu2
libwbclient0	2:3.3.2-1ubuntu3
libwebkit-1.0-1	1.0.1-4
libwnck-common	2.26.0-0ubuntu1
libwnck22	2.26.0-0ubuntu1
libwrap0	7.6.q-16
libx11-6	2:1.1.99.2-1ubuntu2
libx11-data	2:1.1.99.2-1ubuntu2
libxapian15	1.0.7-4
libxau6	1:1.0.4-1
libxaw7	2:1.0.5-1
libxcb-render-util0	0.2.1+git1-1
libxcb-render0	1.1.93-0ubuntu3
libxcb1	1.1.93-0ubuntu3
libxcomposite1	1:0.4.0-3
libxcursor1	1:1.1.9-1
libxdamage1	1:1.1.1-4
libxdmcp6	1:1.0.2-3
libxext6	2:1.0.99.1-0ubuntu3
libxfixes3	1:4.0.3-2
libxfont1	1:1.3.3-1ubuntu1
libxft2	2.1.13-3ubuntu1

libxi6	2:1.2.0-1ubuntu1
libxinerama1	2:1.0.3-2
libxkbfile1	1:1.0.5-1ubuntu2
libxml2	2.6.32.dfsg-5ubuntu4
libxmu6	2:1.0.4-1
libxmuu1	2:1.0.4-1
libxpm4	1:3.5.7-1
libxrandr2	2:1.3.0-1build1
libxrender1	1:0.9.4-2
libxres1	2:1.0.3-1
libxslt1.1	1.1.24-2ubuntu2
libxt6	1:1.0.5-3ubuntu1
libxtrap6	2:1.0.0-5build1
libxtst6	2:1.0.3-1ubuntu2
libxv1	2:1.0.4-1
libxxf86dga1	2:1.0.2-1
libxxf86misc1	1:1.0.1-3
libxxf86vm1	1:1.0.2-1
linux-sound-base	1.0.18.dfsg-1ubuntu8
locales	2.9+cvs20090214-7
lockfile-progs	0.1.11ubuntu2
login	1:4.1.1-6ubuntu6
lsb-base	3.2-20ubuntu4
lsb-release	3.2-20ubuntu4
lsof	4.78.dfsg.1-4
Ixappearance	0.2-1
Ixde	0.3.2.1+svn20080509-5
Ixde-common	0.3.2.1+svn20080509-5
lxde-core	0.3.2.1+svn20080509-5
Ixde-settings-daemon	0.3.2.1+svn20080509-5
Ixpanel	0.3.8.1-2
lxrandr	0.1+svn20080716-3
Ixsession-lite	0.3.6-2
Ixterminal	0.1.3-2
Izma	4.43-14ubuntu1
makedev	2.3.1-88
man-db	2.5.5-1build1

mawk	1.3.3-13ubuntu1	
midori	0.1.2-1ubuntu1	
mime-support	3.44-1	
miscfiles	1.4.2.dfsg.1-9	
mktemp	1.5-9	
module-init-tools	3.7~pre9-2	
mount	2.14.2-1ubuntu4	
mysql-common	5.1.30really5.0.75-0ubuntu10	
ncurses-base	5.7+20090207-1ubuntu1	
ncurses-bin	5.7+20090207-1ubuntu1	
net-tools	1.60-21ubuntu1	
netbase	4.34ubuntu2	
netcat	1.10-38	
netcat-traditional	1.10-38	
notification-daemon	0.4.0-0ubuntu3	
ntpdate	1:4.2.4p4+dfsg-7ubuntu5	
obconf	2.0.3-3build1	
openbox	3.4.7.2-3	
openbox-themes	1.0.2	
openssh-client	1:5.1p1-5ubuntu1	
openssh-server	1:5.1p1-5ubuntu1	
openssl	0.9.8g-15ubuntu3	
p7zip-full	4.58~dfsg.1-1	
passwd	1:4.1.1-6ubuntu6	
pciutils	1:3.0.0-4ubuntu8	
pcmanfm	0.5-3	
perl	5.10.0-19ubuntu1	
perl-base	5.10.0-19ubuntu1	
perl-modules	5.10.0-19ubuntu1	
pm-utils	1.2.2.4-0ubuntu4	
policykit	0.9-2ubuntu1	
powermgmt-base	1.30+nmu1	
procps	1:3.2.7-11ubuntu2	
psmisc	22.6-1	
python	2.6.2-0ubuntu1	
python-central	0.6.11ubuntu7	
python-docutils	0.5-2ubuntu1	

python-minimal	2.6.2-0ubuntu1	
python-support	0.8.7ubuntu4	
python2.5	2.5.4-1ubuntu4	
python2.5-minimal	2.5.4-1ubuntu4	
python2.6	2.6.2-0ubuntu1	
python2.6-dbg	2.6.2-0ubuntu1	
python2.6-minimal	2.6.2-0ubuntu1	
qemu	0.10.0-1ubuntu1	
qt4-qtconfig	4.5.0-0ubuntu4	
quilt	0.46-6	
radeontool	1.5+git76606164-0ubuntu2	
rarian-compat	0.8.1-1ubuntu2	
readline-common	5.2-4	
rpm	4.4.2.3-2ubuntu1	
sed	4.1.5-8	
sgml-base	1.26	
sgml-data	2.0.3	
shared-mime-info	0.60-1	
smartdimmer	0.8b4-1ubuntu2	
startup-tasks	0.3.9-8	
strace	4.5.17+cvs080723-2ubuntu1	
sudo	1.6.9p17-1ubuntu3	
sysklogd	1.5-5ubuntu3	
system-services	0.3.9-8	
sysv-rc	2.86.ds1-61ubuntu11	
sysvinit-utils	2.86.ds1-61ubuntu11	
tar	1.20-1	
tasksel	2.73ubuntu18	
tasksel-data	2.73ubuntu18	
tcl8.4	8.4.19-2	
tcpd	7.6.q-16	
tcpdump	3.9.8-4ubuntu2	
tightvncserver	1.3.9-4	
ttf-dejavu	2.28-1	
ttf-dejavu-core	2.28-1	
ttf-dejavu-extra	2.28-1	
tzdata	2009f-0ubuntu1	

ubuntu-gdm-themes	0.32	
ubuntu-keyring	2008.03.04	
ubuntu-minimal	1.140	
ucf	3.0014	
udev	141-1	
unzip	5.52-12ubuntu1	
upstart	0.3.9-8	
upstart-compat-sysv	0.3.9-8	
upstart-logd	0.3.9-8	
usbutils	0.73-8ubuntu3	
util-linux	2.14.2-1ubuntu4	
vde2	2.2.2-3ubuntu1	
vim	2:7.2.079-1ubuntu5	
vim-common	2:7.2.079-1ubuntu5	
vim-runtime	2:7.2.079-1ubuntu5	
vim-tiny	2:7.2.079-1ubuntu5	
wget	1.11.4-2ubuntu1	
whiptail	0.52.2-11.3ubuntu3	
x-ttcidfont-conf	32	
x11-apps	7.3+4	
x11-common	1:7.4~5ubuntu18	
x11-session-utils	7.3+1	
x11-utils	7.4+1build1	
x11-xfs-utils	7.4+1build1	
x11-xkb-utils	7.4+1ubuntu2	
x11-xserver-utils	7.4+1	
xarchiver	0.5.2+dfsg-1	
xauth	1:1.0.3-2	
xbase-clients	1:7.4~5ubuntu18	
xdg-utils	1.0.2-6.1	
xfonts-base	1:1.0.0-5	
xfonts-encodings	1:1.0.2-3	
xfonts-intl-chinese	1.2.1-6ubuntu3	
xfonts-intl-chinese-big	1.2.1-6ubuntu3	
xfonts-utils	1:7.4+1ubuntu1	
xinit	1.0.9-2	
xkb-data	1.5-2ubuntu11	

xml-core	0.12	
xscreensaver	5.07-0ubuntu3	
xscreensaver-data	5.07-0ubuntu3	
xserver-common	2:1.6.0-0ubuntu14	
xserver-xorg	1:7.4~5ubuntu18	
xserver-xorg-core	2:1.6.0-0ubuntu14	
xserver-xorg-input-all	1:7.4~5ubuntu18	
xserver-xorg-input-evdev	1:2.1.1-1ubuntu4	
xserver-xorg-input-kbd	1:1.3.1-2ubuntu1	
xserver-xorg-input-mouse	1:1.4.0-1	
xserver-xorg-input-synaptics	0.99.3-2ubuntu4	
xserver-xorg-input-wacom	1:0.8.2.2-0ubuntu2	
xserver-xorg-video-all	1:7.4~5ubuntu18	
xserver-xorg-video-apm	1:1.2.1-1	
xserver-xorg-video-ark	1:0.7.1-1	
xserver-xorg-video-ati	1:6.12.1-0ubuntu2	
xserver-xorg-video-chips	1:1.2.1-1	
xserver-xorg-video-cirrus	1:1.2.1-3	
xserver-xorg-video-fbdev	1:0.4.0-3	
xserver-xorg-video-i128	1:1.3.1-2ubuntu1	
xserver-xorg-video-i740	1:1.2.0-2	
xserver-xorg-video-mach64	6.8.0-3	
xserver-xorg-video-mga	1:1.4.9.dfsg-3	
xserver-xorg-video-neomagic	1:1.2.2-1	
xserver-xorg-video-nv	1:2.1.12-1ubuntu5	
xserver-xorg-video-r128	6.8.0+git20090201.08d56c88-1	
xserver-xorg-video-radeon	1:6.12.1-0ubuntu2	
xserver-xorg-video-rendition	1:4.2.0.dfsg.1-2ubuntu1	
xserver-xorg-video-s3	1:0.6.1-1	
xserver-xorg-video-s3virge	1:1.10.2-1	
xserver-xorg-video-savage	1:2.2.1-4ubuntu2	
xserver-xorg-video-siliconmot	1:1.7.0-1	
ion		
xserver-xorg-video-sis	1:0.10.1-1	
xserver-xorg-video-sisusb	1:0.9.0-4	
xserver-xorg-video-tdfx	1:1.4.0-2	
xserver-xorg-video-trident	1:1.3.0-1ubuntu1	

xserver-xorg-video-tseng	1:1.2.0-1ubuntu1	
xserver-xorg-video-v4l	1:0.2.0-1ubuntu5	
xserver-xorg-video-vesa	1:2.0.0-1ubuntu6	
xserver-xorg-video-voodoo	1:1.2.0-1ubuntu1	
xulrunner-1.9	1.9.0.8+nobinonly-0ubuntu2	
xulrunner-1.9.1	.9.1~b4~hg20090330r24021+nobinonly-0ub	
	untu1	
zenity	2.26.0-0ubuntu2	
zip	2.32-1	
zlib1g	1:1.2.3.3.dfsg-12ubuntu2	

1.4 Special Features

In addition to the standard Ubuntu Linux functionality, Embedian has extended the operating system by following features:

Table 1.3	Special Features		
Special Features	Description		
Direct SD Boot	Boot Directly from SD card. It is very useful for		
	maintenance purposes.		
LCD Customizer	Set all types of LCD resolution parameters by using		
	fbset utility.		
NAND Flash	To recover the firmware in NAND flash from NOR		
Writer	flash or SD card by jumper setting.		
MPlayer	Integrate the MFC drivers into Mplayer		
Calibration	Calibration program for touch application.		
Program			

Table 1.3 Special Features



System Information

This Chapter gives an introduction of system information to let users quickly pick up how to setting up the system. Section include :

- System Setup
- Jumper Setting
- Firmware architecture in NAND flash

Chapter 2 System Information

This Chapter gives an introduction of hardware information so that users can quickly set up the system.

2.1 Starting EVKM-MXM-6410

Before starting, please check the jumper to make sure that the jumper configuration is matching your demand. Figure 2.1 shows the steps.

Figure 2.1 Starting EVKM-MXM-6410



- 1. Press the MXM-6410 module and screw it tightly.
- Connect the console port (UART0, CN20 on figure 2.3) to the console cable, then to a null modem cable and then connect to your PC. Open up the DNW 0.6c (Click "Connect" at "Serial Port" tab) or Hyper Terminal and set the baud rate to 115200, 8N1, no hardware flow control.
- 3. Connect the backlight invert board power to CN9.
- 4. Connect the LCD FPC Cable (Top Contact) or LVDS cable.
- 5. Connect the power cable to power board.
- 6. Boot the device and you should be able to see the Ubuntu gdm login prompt on the LCD screen. The default user is *ubuntu* and password is

mxm6410. (If login from the console, the root pass is also mxm6410.)

2.2 Jumper Setting

This section gives details of the hardware features of the EVKM-MXM-6410. These include a description of the switches, jumper settings, connectors and connector pin outs.

Jumpers

The EVKM-MXM-6410 SBC has a number of jumpers that allow you to configure your system to suit your application. All use 2mm shorting blocks (shunts) to select settings. Turn off power of the EVKM-MXM-6410 before changing the position of a shunt.

Jumper Location Figure 2.2 Jumper Location



List of Jumpers

The table below lists the function of various jumpers.

Table 2.1	Jumpers
-----------	---------

Table 2.1	Jumpers
Label	Function
JP1	NOR boot or NAND boot Setting and LCD Scan Direction
	Setting
JP2	LCD Power Setting (3.3V or 5V for both TTL and LVDS)
JP3	RS232/422/485 Setting
S1	Reset Button

Jumper Settings

The following tables describe how the jumper shunts to various configurations.

JP1: Location on Board, D1

Table 2.2	NOR Boot or NAND Boot and LCD Scan Direction		
	Setting		
	Setting	Function	
ōŏ	N.C.(Default)	NAND Boot	
5 O O 6	JP1 (1-2)	NOR Boot	
JP1	JP1 (3-4)	Pull-High of CN14 Pin 30	
	JP1 (5-6)	Pull-High of CN14 Pin 31	

Table 2.2 NOR Boot or NAND Boot and LCD Scan Direction Setting (JP1)

JP2: Location on Board, C1

Table 2.3 LCD VCC Power Setting for CN14 and CN15 (JP2) (from CPU LVDS and TTL)

Table 2.3	LCD VCC Power Setting for CN14 (JP2) (from CPU LVDS		
	and TTL)		
1	Setting	Function	
ō	JP2(1-2)(Default)	3.3V	
3 O	JP2(3-4)	5V	
JP2			

JP3: Location on Board, B6

Table 2.4	RS232/422/485 Setting		
	Setting	Function	
ōŏ	JP3(1-2)(Default)	RS232	
₅ОО₅	JP3(3-4)	RS422/RS485 half duplex	
JP3	JP3(5-6)	RS422/RS485 full duplex	

Table 2.4 RS232/422/485 Mode Setting

Note: If JP3 jumper set to be RS232, the RS232 connector will be CN20 (UART1) header. If JP3 jumper set to be RS422 and RS485, the connector will be CN22 header. User can only choose one (RS232 or RS422 or RS485) at the same time.

S1: Location on Board, D6

Table 2.5 Reset Button

Table 2.5	Reset Button		
	Setting		Function
	Press Button a	and	Reset CPU and IO
	Release Immediately		

Setting Jumpers

You configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper you connect the pins with the clip.

To "open" a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



The jumper settings are schematically depicted in this manual as follows.

00		
Open	Closed	Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any change.

Generally, you simply need a standard cable to make most connections.

2.3 Connectors

Onboard connectors link the EVKM-MXM-6410 to external devices such as LCD panel, a keyboard, an audio headset or SD/SDIO and to external communication such as 802.11, USB or Ethernet link. The table below lists the function of each of the board's connectors.

Connector Location Figure 2.3 Connector Location



List of Connectors

Table 2.6 List of Connectors

Table 2.6	Connector	
Label	Function	
CN5	JTAG	
CN6	CF Type I/II Connector	
CN7	SATA Connector	
CN8	Power Connector	
CN9	LCD Backlight Inverter Connector	
CN10	RTC Battery Connector	
CN11	Audio (Microphone in, Headphone out, Line in) Connector	
CN12	Buzzer	
CN13	S-Video and CVBS Video Connector	
CN14	TTL Level LCD FPC Connector	
CN15	LVDS LCD Connector	
CN16	VGA DSub-15 Connector	
CN17	Ethernet RJ45 and Double USB Host Type A Connector	
CN18	Double USB Host Header	
CN19	USB OTG Type B Connector	
CN20	UART 0 and UART 1 Header	
CN21	UART 2 and UART 3 Header	
CN22	SPI and RS422/485 Header	
CN23	UART 4 and UART 5 Header	
CN24	SD/SDHC Connector	
CN25	GPIO Header	
CN26	4-Wire Touch Panel Connector	
CN27	CAN Bus Connector	

For more details, users can refer to the hardware manual..

Chapter 3

Using Ubuntu Jaunty Jackalope

This Chapter details how to use the Ubuntu Linux of MXM-6410 computer on module or APC-6410 single board computer.

Section include :

- Booting
- Default root pass and user
- Network Setting
- Manually add repositories
- Install Software Packages
- FTP Client
- FTP Server
- Telnet/SSH Server
- VNC server

- GDM
- LXDE
- Calibration and Touch Screen
- Kiosk Mode
- NAND Root File System
- Cross Toolchain

Chapter 3 Using Ubuntu Jaunty Jackalope

This chapter gives an introduction in regarding to use the Ubuntu Linux 9.04 Jaunty Jackalope system on MXM-6410 computer on module or APC-6410 single board computers. This guide is mainly focus on the topic related to Embedian's products. This guide is not an official Ubuntu documentation. But still, a good reference for those people who are interested in Ubuntu 9.04.

3.1 Booting

When power on, the uboot will initialize the low-level hardware and bring the Linux kernel to DDR RAM. After that, the Linux kernel will take over the system. The linuxrc is a program that is started in the start-up stage of the kernel prior to the actual boot process. This allows you to boot a small modularized kernel and to load the few drivers that are really needed as modules. linuxrc assists in loading relevant drivers manually. The use of linuxrc provides with the choices to boot into a small root file system in NAND or the Ubuntu 9.04 system in SD card. (The default is set to boot into SD card with Ubuntu 9.04.)



The NAND file system is in ext3 format and can be served as a disk-based rescue system or for some simpler applications that don't need a SD card at all. For more details in regarding to NAND file system, users can refer to section 3.14.

If you have LCD attached, users should be able to see the following gdm login screen showing on your LCD.

	Username:	
D Options		Tue Feb 24, 9:41 PM

3.2 Default root pass and user

The default *root* password is *mxm6410* and default user is *ubuntu* and the ubuntu user default password is also *mxm6410*.

3.2.1 Create a User

To add a user, you can use *useradd* command.

ubuntugubuntu:«\$ usereddbelr	
Usage: useradd [ontions] LOGIN	
usage. useradu [opcions] hooin	
Options:	
-b,base-dir BASE DIR	base directory for the new user account
enti - sedan stri taki biri - si vinden - e navisore	home directory
-c,comment COMMENT	set the GECOS field for the new user account
-d,home-dir HOME DIR	home directory for the new user account
-D,defaults	print or save modified default useradd
	configuration
-e,expiredate EXPIRE DATE	set account expiration date to EXPIRE DATE
-f,inactive INACTIVE	set password inactive after expiration
	to INACTIVE
-g,gid GROUP	force use GROUP for the new user account
-G,groups GROUPS	list of supplementary groups for the new
	user account
-h,help	display this help message and exit
-k,skel SKEL_DIR	specify an alternative skel directory
-K,key KEY=VALUE	overrides /etc/login.defs defaults
-1,	do not add the user to the lastlog and
	faillog databases
-m,create-home	create home directory for the new user
	account
-N,no-user-group	do not create a group with the same name as
	the user
-o,non-unique	allow create user with duplicate
	(non-unique) UID
-p,password PASSWORD	use encrypted password for the new user
	account
-r,system	create a system account
-s,shell SHELL	the login shell for the new user account
-u,uid UID	force use the UID for the new user account
-U,user-group	create a group with the same name as the user

3.2.2 Set User Password

After create a user, you can use *passwd* command to set the password.

```
ubuntu@ubuntu:~$ passwd --help
Usage: passwd [options] [LOGIN]
Options:
                               report password status on all accounts
  -d, --delete
                               delete the password for the named account
 -e, --expire
                               force expire the password for the named account
 -h, --help
                              display this help message and exit
                              change password only if expired set password inactive after expiration
 -k, --keep-tokens
  -i, --inactive INACTIVE
                                to INACTIVE
 -1, --lock
                               lock the password of the named account
 -n, --mindays MIN_DAYS
                              set minimum number of days before password
                               change to MIN DAYS
 -q, --quiet
                               quiet mode
 -r, --repository REPOSITORY change password in REPOSITORY repository
                              report password status on the named account
  -S, --status
                               unlock the password of the named account
  -u, --unlock
  -w, --warndays WARN DAYS
                               set expiration warning days to WARN DAYS
  -x, --maxdays MAX_DAYS
                               set maximim number of days before password
                                change to MAX DAYS
ubuntu@ubuntu:~$
```

Example:

Below is an example to create a user *john* with home directory and set his password.

ubuntu@ubuntu:~\$ sudo userdel -r john ubuntu@ubuntu:~\$ sudo useradd -m john ubuntu@ubuntu:~\$ sudo passwd john Enter new UNIX password: Retype new UNIX password: passwd: password updated successfully ubuntu@ubuntu:~\$
3.2.3 Delete a User

To delete a user, you can use *userdel* command.

```
ubuntu@ubuntu:~$ userdel --help
Usage: userdel [options] LOGIN
Options:
-f, --force force removal of files,
even if not owned by user
-h, --help display this help message and exit
-r, --remove remove home directory and mail spool
ubuntu@ubuntu:~$
```

Example:

Below is an example to delete a user *john* with removal of home directory and mail spool.

```
ubuntu@ubuntu:~$ sudo userdel -r john
[sudo] password for ubuntu:
ubuntu@ubuntu:~$ <mark>-</mark>
```

3.3 Network Settings

The default IP is set static and network configuration is as follows.

IP address 192.168.1.121 netmask 255.255.255.0 gateway 192.168.1.254



Users can use *ifconfig* to change the IP address at runtime.

```
ubuntu@ubuntu:~$ ifconfig --help
Usage:
  ifconfig [-a] [-v] [-s] <interface> [[<AF>] <address>]
  [add <address>[/<prefixlen>]]
 [del <address>[/<prefixlen>]]
 [[-]broadcast [<address>]] [[-]pointopoint [<address>]]
[netmask <address>] [dstaddr <address>] [tunnel <address>]
 [outfill <NN>] [keepalive <NN>]
  [hw <HW> <address>] [metric <NN>] [mtu <NN>]
  [[-]trailers] [[-]arp] [[-]allmulti]
  [multicast] [[-]promisc]
  [mem_start <NN>] [io_addr <NN>] [irq <NN>] [media <type>]
  [txqueuelen <NN>]
  [[-]dynamic]
  [up|down] ...
  <HW>=Hardware Type.
  List of possible hardware types:
    loop (Local Loopback) slip (Serial Line IP) cslip (VJ Serial Line IP)
   slip6 (6-bit Serial Line IP) cslip6 (VJ 6-bit Serial Line IP) adaptive (Adap
tive Serial Line IP)
   strip (Metricom Starmode IP) ash (Ash) ether (Ethernet)
   tr (16/4 Mbps Token Ring) tr (16/4 Mbps Token Ring (New)) ax25 (AMPR AX.25)
    netrom (AMPR NET/ROM) rose (AMPR ROSE) tunnel (IPIP Tunnel)
    ppp (Point-to-Point Protocol) hdlc ((Cisco)-HDLC) lapb (LAPB)
   arcnet (ARCnet) dlci (Frame Relay DLCI) frad (Frame Relay Access Device)
   sit (IPv6-in-IPv4) fddi (Fiber Distributed Data Interface) hippi (HIPPI)
   irda (IrLAP) ec (Econet) x25 (generic X.25)
   eui64 (Generic EUI-64)
  <AF>=Address family. Default: inet
  List of possible address families:
    unix (UNIX Domain) inet (DARPA Internet) inet6 (IPv6)
    ax25 (AMPR AX.25) netrom (AMPR NET/ROM) rose (AMPR ROSE)
    ipx (Novell IPX) ddp (Appletalk DDP) ec (Econet)
   ash (Ash) x25 (CCITT X.25)
```

Example:

Below is an example to change the IP address to 192.168.1.122 and netmask to 255.255.255.0 at runtime.



3.3.1 Configure Network Configuration at Boot or Network Restart

The *ifconfig* command only changes the network setting at runtime. After reboot or network restart, the network configuration will be restored to default values. To determine the network configuration at boot or network

restart, users need to modify the /etc/network/interfaces file.

3.3.1.1 Static IP

To configure the device networking configuration as static IP, user need to modify the */etc/network/interfaces* file first.

```
ubuntu@ubuntu:~$ vim /etc/network/interfaces
ubuntu@ubuntu:~$
```

Modify the network configurations



After modified this file, you can reboot the device or just use the

/etc/init.d/networking restart

command to restart the networking configuration.

```
ubuntu@ubuntu:~$ sudo /etc/init.d/networking restart
* Reconfiguring network interfaces...
ubuntu@ubuntu:~$
```

3.3.1.2 DHCP

To configure the device networking configuration as DHCP, user need to modify the */etc/network/interfaces* as follows.

```
auto lo
iface lo inet loopback
auto eth0
iface eth0 inet dhcp
# iface eth0 inet static
# address 192.168.1.121
# netmask 255.255.255.0
# gateway 192.168.1.254
```

After modified this file, you can reboot the device or just use the */etc/init.d/networking restart* command to restart the networking configuration.

```
ubuntu@ubuntu:~$ sudo /etc/init.d/networking restart
* Reconfiguring network interfaces... Internet Systems Consortium DHCP
Copyright 2004-2008 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/sw/dhcp/
Listening on LPF/eth0/00:41:33:1f:05:cf
Sending on Socket/fallback
Internet Systems Consortium DHCP Client V3.1.1
Copyright 2004-2008 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/sw/dhcp/
Listening on LPF/eth0/00:41:33:1f:05:cf
Sending on LPF/eth0/00:41:33:1f:05:cf
Sending on Socket/fallback
DHCPDISCOVER on eth0 to 255.255.255 port 67 interval 6
DHCPDISCOVER on eth0 to 255.255.255.255 port 67 interval 6
DHCPREQUEST of 192.168.1.44 from 192.168.1.254
DHCPREQUEST of 192.168.1.44 from 192.168.1.254
bound to 192.168.1.44 from 192.168.1.254
bound to 192.168.1.44 - renewal in 597534 seconds.
[ 0K ]
ubuntu@ubuntu:~$
```

You can see the device IP has been assigned as 192.168.1.44 after network restart.

Note:

At development stage, users might take the MXM-6410 module off from the carrier board and replace by the other new module. If that is the case, Ubuntu will find out the MAC address has been changed and will view the original eth0 network device as eth1. The network configuration settings mentioned above will not take effect. If users want to change the network configuration setting under this situation, you need to modify the */etc/udev/rules.d/70-persistent-net.rules* file first time when you replace the CPU module.

ubuntu@ubuntu:~\$ sudo vim /etc/udev/rules.d/70-persistent-net.rules

And delete the following lines.

net device ()
SUBSYSTEM=="net", ACTION=="add", DRIVERS=="?*", ATTR(address)=="00:41:33:1f:05:c
f", ATTR(type)=="1", KERNEL=="eth*", NAME="eth0"

After next reboot or network restart, Ubuntu will generate the new settings to this file to fix the network device interface.

3.4 Manually add repositories

Do this at your own risk. Modify the default Ubuntu sources.list only if you understand what you're doing. Mixing repositories can **break** your system. For more information see the <u>Ubuntu Command-line Repository guide</u>. Create a backup of your current list of sources.

ubuntu@ubuntu:~\$ sudo cp -p /etc/apt/sources.list /etc/apt/sources.list_backup ubuntu@ubuntu:~\$

Note:

1. *sudo* - runs the command with root privileges. cp = copy. -p = prompt to overwrite if a file already exists.

2. Edit the list of sources:

ubuntu@ubuntu:~\$ sudo vim /etc/apt/sources.list

The default repositories are:

deb http://ports.ubuntu.com/ubuntu-ports jaunty main universe multiverse restricted
deb-src http://ports.ubuntu.com/ubuntu-ports jaunty main universe multiverse restricted

3. To use your local mirror you can add "xx." before *archive.ubuntu.com*, where **xx** = your country code.

Example: deb http://gb.archive.ubuntu.com/ubuntu jaunty main restricted universe multiverse indicates a repository for Great Britain (gb).

4. Refresh the packages list from the new repositories:

ubuntu@ubuntu:~\$ sudo apt-get update

3.5 Install Software Packages

3.5.1 List of installed software packages

To visualize the list of installed packages, we use the following command ubuntu@ubuntu:~\$ dpkg-query -W

To visualize an installed package whose name is *vim* for example, we use the previous command and a redirection (or pipeline) to the *grep* command. Practically, we have:



3.5.2 Description of installed software packages

The description of the set of installed packages is obtained via the command

ubuntuQubuntu:~\$ dpkg -1

3.5.3 List of available software packages

The list of available packages is obtained as follows:

ubuntu@ubuntu:~\$ apt-cache pkgnames

We clearly see that the list is not in alphabetical order. To resolve this issue, we redirect and sort the output:

ubuntu@ubuntu:~\$ apt-cache pkgnames | sort

3.5.4 Searching a software package: apt-cache search

To search a software package, we proceed as follows:

ubuntu@ubuntu:~\$ apt-cache search wget devscripts - scripts to make the life of a Debian Package maintainer easier emacs-goodies-el - Miscellaneous add-ons for Emacs wget - retrieves files from the web abcde - A Better CD Encoder apt-mirror - APT sources mirroring tool apt-zip - Update a non-networked computer using apt and removable media axel - light download accelerator - console version axel-dbg - light download accelerator - debugging symbols axel-kapt - light download accelerator - graphical front-end epiphany-extension-gwget - Gwget extension for Epiphany web browser gtm - Multiple files transfer manager gwget - GNOME front-end for wget mirror - keeps FTP archives up-to-date puf - Parallel URL fetcher snarf - A command-line URL grabber wget-el - an interface for wget on Emacsen wput - A tiny wget-like ftp-client for uploading files ubuntu@ubuntu:~\$

This command displays software packages containing the expression wget.

3.5.5 Properties and information of a software: apt-cache show

To display information related to a package, for instance the gwget package,

we proceed as follows:

ubuntu@ubuntu:~\$ apt-cache show gwget Package: gwget Priority: optional Section: universe/gnome Installed-Size: 1336 Maintainer: Ubuntu MOTU Developers <ubuntu-motu@lists.ubuntu.com> Original-Maintainer: Arnaud Fontaine <arnau@debian.org> Architecture: armel Source: gwget2 Version: 1.0.1-Oubuntu1 Replaces: gwget2 Provides: gwget2 Depends: libart-2.0-2 (>= 2.3.18), libatk1.0-0 (>= 1.20.0), libbonobo2-0 (>= 2.1 5.0), libbonoboui2-0 (>= 2.15.1), libc6 (>= 2.4), libcairo2 (>= 1.2.4), libdbus-1-3 (>= 1.0.2), libdbus-glib-1-2 (>= 0.78), libfontconfig1 (>= 2.4.0), libfreety pe6 (>= 2.2.1), libgconf2-4 (>= 2.13.5), libglade2-0 (>= 1:2.6.1), libglib2.0-0 (>= 2.16.0), libgnome2-0 (>= 2.17.3), libgnomecanvas2-0 (>= 2.11.1), libgnomeui-0 (>= 2.22.0), libgnomevfs2-0 (>= 1:2.17.90), libgtk2.0-0 (>= 2.16.0), libice6 >= 1:1.0.0), libnotify1 (>= 0.4.4), libnotify1-gtk2.10, liborbit2 (>= 1:2.14.10) libpango1.0-0 (>= 1.14.0), libpixman-1-0, libpng12-0 (>= 1.2.13-4), libpopt0 = 1.14), libsm6, libx11-6, libxcb-render-util0 (>= 0.2.1+git1), libxcb-render0, libxcb1 (>= 1.1.92), libxml2 (>= 2.6.27), libxrender1, zlib1g (>= 1:1.1.4), gco nf2 (>= 2.10.1-2), wget (>= 1.10) Conflicts: epiphany-extension-gwget (<< 0.97-1), gwget2 Filename: pool/universe/g/gwget2/gwget_1.0.1-Oubuntu1_armel.deb Size: 230510 MD5sum: 45aad4cccOfOd9c657ec588d14ec73d4 SHA1: e8f95b0957af34be40c595ee9550508afaf8a5c8 SH1256: 942cfb10fd3d2f6f7517102e461ebd15cf6d495703c8e8a17338d1871d259e44 Description: GNOME front-end for wget Gwget offers a GNOME front-end to the popular wget application, with enhanced features, such as systray icon, multiple downloads and a powerful preferences manager. Homepage: http://gnome.org/projects/gwget/ Bugs: https://bugs.launchpad.net/ubuntu/+filebug Origin: Ubuntu ubuntu@ubuntu:~\$ 📘

Note that the *exact* name of the package should be entered! For example,

ubuntu@ubuntu:~\$ apt-cache show flash W: Unable to locate package flash E: No packages found ubuntu@ubuntu:~\$

does not yield any result since **flash** is not he name of a package.

3.5.6 Installing a software: apt-get install Assume we want to install **firefox**. We type: ubuntu@ubuntu:~\$ sudo apt-get install firefox

3.5.7 Removing a software: apt-get remove

To uninstall a package, we can proceed in two ways. Either 1) we uninstall only the software or 2) the software and its configuration files.

In the first case, assuming we want to uninstall the *mplayer* software, we type:

ubuntu@ubuntu:~\$ sudo apt-get remove mplayer

In the second case, if we want to uninstall both 'mplayer' and its configuration files, we type:

ubuntu@ubuntu:~\$ sudo apt-get remove --purge mplayer

3.5.8 Updating the software list: apt-get update

Updating a list of software is not the same as updating the software *per se*. Only the list is actually updated:

ubuntu@ubuntu:~\$ sudo apt-get update

3.5.9 Upgrading the software: apt-get upgrade

The *upgrade* command installs the most recent versions of all packages on the system.

ubuntu@ubuntu:~\$ sudo apt-get upgrade

To simulate an update installation, i.e. to see which software will be updated, we type:

ubuntu@ubuntu:~\$ sudo apt-get -s upgrade

3.5.10 Smart software update: apt-get dist-upgrade

The *dist-upgrade* command has the same effect as the 'upgrade' except that a smart management is used in changes of dependencies in new versions: conflict resolution and discarding less important packages for more important ones, for example.

ubuntu@ubuntu:~\$ sudo apt-get dist-upgrade

3.6 FTP Client

The *lftp* is default included in the root file system. You might use *apt-get install* to use a dedicated ftp client. To use the *ltfp* FTP client, assuming the remote host IP address is *59.124.115.43* and the user is *eric*,



You can use *put <filename>* to put transmit a file from local device to remote server and *get <filename>* to get a file from remote server to local device, and use *bye* to exit the lftp command mode.

You can also use *wget* command to get the file from webserver.

3.7 FTP Server

The ftp server is not included in the root file system by default. However, it is very easy to have one. In this section, we would like to take the *vsftpd* server as an example.

First, we need to apt-get install the vsftpd packages.

ubuntu@ubuntu:~\$ sudo apt-get install vsftpd

You can use *netstat* commad to check if the vsftpd has been successfully installed.

```
ubuntu@ubuntu:~$ netstat -tul |grep ftp
tcp 0 0 *:ftp *:* LISTEN
```

If you saw the ftp has been *LISTEN*, then means the vsftpd is running. The default vsftpd is configured only allow the a*nonymous* user to ftp in without password. We now need to configure the */etc/vsftpd.conf* file.

ubuntu@ubuntu:~\$ sudo vim /etc/vsftpd.conf

Below are the common settings for vsftpd. For advanced settings, users can read the remarks from the same file.

anonymous_enable=NO (YES means allow the anonymous user to login to ftp. NO means not allow anonymous user to login to ftp)

chroot_local_user=YES (Uncomment this to restrict local users to their home directories and cannot change directory to other system directory.)

local_umask=022 (Uncomment this will make the privilege of the upload file to 755; If comment out this line, the default privilege of upload file is 700.)

local_enable=Yes (Uncomment this to allow local users to log in.)

write_enable=YES (Uncomment this to enable any form of FTP write command.)

After made the changes, we need to restart the vsftpd server by

```
ubuntu@ubuntu:~$ sudo /etc/init.d/vsftpd restart
* Stopping FTP server: vsftpd [ OK ]
* Starting FTP server: vsftpd [ OK ]
ubuntu@ubuntu:~$
```

And now you can use the common FTP client software like Filezilla to FTP files into the user home directory.

3.8 Telnet/SSH Server

The telnet and ssh server are default included in the root file system. You can telnet or ssh to the device from a remote telnet/ssh client such as putty.

🔀 PuTTY Configuration		X		
Category:				
E Session	Basic options for your PuTTY session			
Logging	C Specify the destination you want to conne	ect to		
Keuboard	Host <u>N</u> ame (or IP address)	Port		
Bell	192.168.1.121	22		
Features	Connection type: <u>Raw</u> <u>I</u> elnet Rlogin <u>S</u> SH	H 🔿 Serial		
Appearance Behaviour Translation Selection Colours Connection Data Proxy Telnet Rlogin E SSH Serial	Load, save or delete a stored session Sav <u>e</u> d Sessions			
	Default Settings	Load Sa <u>v</u> e Delete		
	Close <u>w</u> indow on exit: Always Never Only on c	lean exit		
About	<u>O</u> pen	Cancel		

Click Open to login and you will see the following screen.



3.9 VNC Server

The VNC server allows users to see the desktop of a MXM-6410 based remote device and control it with your local mouse and keyboard and without attaching an LCD to the device, just like you would do it sitting in the front of that MXM-6410 based device.

First of all you need to install the tightVNC server first.



Now you can start vncserver to have a new display (called :1)



It will create .vnc directory under /root. It also will ask you a password (insert it twice) and for the viewing password answer NO.

Now it's time to stop it for few more configurations.



and move to the configuration files

\$ sudo vim /home/ubuntu/.vnc/xstartup

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commenting out everything and insert the following two lines:

- openbox &
- Ixsession



And now you can start vncserver again.



At the Windows XP client side, you can download the free VNC viewer from http://www.tightvnc.com/download.php

Open up the vncviewer program

New Tight¥l	? 🔀	
VNC server:	192.168.1.121:1	Connect
tint	Connection profile	Options
VNC	 <u>D</u>efault connection options 	Cancel
	O <u>H</u> igh-speed network	Listening mode

Click "Connect" and it will pop out a password authentication window. Enter the password.

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Standard V	NC Authentication 🛛 🔀
VNC Host:	192.168.1.121:1
tight	User name:
VNC	Password: ******
	<u>DK</u> <u>C</u> ancel

Click "OK" and you will the device desktop on the remote client side.



To kill the VNC service,

ubuntu@ubuntu:~\$ s	udo vncserver	-kill :1	
Killing Xtightvnc	process ID 432	26	
ubuntu@ubuntu:~\$			

3.10 GDM

Embedian MXM-6410 uses GDM Gnome Display Manager) as the graphical login program. GDM is the GNOME Display Manager, a graphical login program that uses XWindow.

GDM provides the equivalent of a "login:" prompt for X displays- it pops up a login window and starts an X session.

It provides all the functionality of xdm, including XDMCP support for managing remote displays.

To stop the gdm service, you can use the command

/etc/init.d/gdm stop

You can use gdm to load different desktop environments and Window Mangers. Because of the memory limitation, the default is using the LXDE system. If users would like to consider GNOME, the 256MB DDR RAM is the minimum requirement.

3.11 LXDE

Because of the memory limitation, Embedian chooses LXDE as default desktop environment. After login into the GDM display manager, the GDM will launch LXDE directly by default.

LXDE, *Lightweight X11 Desktop Environment*, is a desktop environment which is lightweight and fast. It is designed to be user friendly and slim, and keep the resource usage low. LXDE uses less RAM and less CPU while being a feature rich operating system. Because of the low usage of resources it also saves energy. We don't tightly integrate every component of LXDE. Instead, we try to make all components independent, so each of them can be used independently with few dependencies. More about LXDE on the <u>lxde.org</u> <u>website</u>, the<u>LXDE blogs</u>, and in the <u>LXDE forum</u>.

LXDE Components

 <u>PCManFM</u>, is a fast and lightweight file manager with features like Drag & Drop support, tabbed browsing (Similiar to Firefox), Built-in file searching utility, fast load of large directories, File association support (Default application), Thumbnail for image files, Bookmarks support, correct handling of non-UTF-8 encoded filenames and more.

- LXLauncher, easy-mode application launcher
- <u>LXPanel</u>, desktop panel, the panel can generate menu for installed applications automatically from *.desktop files. It can be configured from GUI preference dialog, and there is no need to edit config files. The component provides a "Run" dialog with autocompletion.
- <u>LXSession</u>, session manager, The LXSession manager is used to automatically start a set of applications and set up a working desktop environment. Moreover, the session manager is able to remember the applications in use when a user logs out and to restart them the next time the user logs in.
- <u>LXSession Edit</u>, window manager used in LXDE can be changed, ability to turn on disabled applications
- <u>LXAppearance</u>, theme switcher. You can change the theme, icons, and fonts used by applications easily.
- Leafpad, text editor
- Xarchiver, archiving
- <u>GPicView</u>, image viewer, GPicView features lightening fast startup and intuitive interface.
- <u>LXTerminal</u>, terminal emulator
- LXTask, task manager / system monitor
- <u>LXNM</u>, lightweight network connection helper daemon for LXDE supporting wireless connections (Linux-only)
- Openbox, window manager and obconf
- <u>LXRandr</u>, screen manager, manages screen resolution and external monitors
- LXShortCut, an easy way to edit application shortcuts
- LXMusic, minimalist xmms2-based music player
- <u>LXDE Common</u>, the default settings configuration file for integrating the different components of LXDE. LXDE Common manages the system behavior and functions to integrate icons and artwork.
- <u>GtkNetCat</u>, Graphic User Interface for netcat. Netcat provides system functions as a computer networking utility for reading from and writing to network connections on either TCP or UDP.

Embedian Add-on Components

- *GMplayer*, is the GUI of Mplayer. It is integrated by Embedian to support the hardware MFC from CPU. Details can be found at section 4.1.
- **Calibrate TouchScreen**, is a tool to calibrate the touch screen.

3.12 Calibration and Touch Screen

Some applications use touch panel as input device. If that is the case, users need to install the calibration program that Embedian provided first.

3.12.1 Install the Calibration Program

Iftp the tarball (*ts_upgrade.tar.gz*) that Embedian provided with to the device */tmp* directory and extract it. Execute the *./install.sh* command.

```
root@ubuntu:/tmp# ls
ts_upgrade.tar.gz
root@ubuntu:/tmp# tar xvfz ts_upgrade.tar.gz
embedian-mxm6410-touchscreen.deb
install.sh
root@ubuntu:/tmp# ./install.sh
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
    xserver-xorg-input-all xserver-xorg-input-synaptics
O upgraded, O newly installed, 2 to remove and 14 not upgraded.
After this operation, 254kB disk space will be freed.
Do you want to continue [Y/n]? Y
```

The calibration program installation is done now. Reboot and you will be asked to calibrate the device first now.

3.12.2 Calibration Program

The device will only ask you calibrate at first boot. After the first calibration, the calibration value will be stored. And the next boot will check if this value existing or not. If yes, the device will just use this value.

To re-calibrate the device, user can either use the following command

ts_calibrate

Or pending at the touch screen for a while when booting.

3.13 Kiosk Mode

3.13.1 Boot Ubuntu 9.04 into text mode instead of graphic mode

Some users' applications are relatively simple and they develop their GUIs directly on top of frame buffer (/*dev/fb0*). They don't even need X11 running on the device. Or some server applications don't need to have a graphic interface at all. To boot into text mode or to disable a service (such as GDM) from being started in a given runlevel (e.g., 2 which is Ubuntu's default runlevel) is like so:

ubuntu@ubuntu:~\$ sudo mv /etc/rc2.d/S30gdm /etc/rc2.d/K70gdm ubuntu@ubuntu:~\$ sudo shutdown now -r

After reboot, you will see the text mode booting into the LCD screen. You can reverse this file back to boot into graphic mode again.

If you would like launch the, for example, *mplayer* application under the text mode, you can

ubuntu@ubuntu:~\$ mplayer -quiet -fs -vo fbdev test.avi

And you can write a simple script to let this program to startup automatically at boot.

If you would like to stop the X11 and X application at runtime, you can



To make your services startup at boot, Ubuntu Linux use *update-rc.d* command to install and remove System-V style init script links. Let us take the *mysql* service for example.

Turn on or start service called *mysql* on boot

ubuntu@ubuntu:/etc\$ sudo update-rc.d mysql defaults

Remove service called *mysql* on boot:

ubuntu@ubuntu:/etc\$ sudo update-rc.d mysql remove

OR ubuntu@ubuntu:/etc\$ sudo update-rc.d -f mysql remove

Replace *mysql* name with actual service name.

Note:

It is not recommended to boot into text mode by using *update-rc.d remove* and *update-rc.d defaults*. "update-rc.d foo defaults" will not put "foo" back into its previous start-up slot, but puts it at S20 by braindead "default". It's the oldest surviving bug in UNIX history. For gdm this can cause real grief because it puts it before processes that should have completed start-up before gdm goes about its merry ways.

3.13.2 GDM Auto Login

To allow Ubuntu GDM Auto Login, you need edit gdm.conf and add the user you want to auto login. Let's assume the user that you would like to auto login is *ubuntu*.



Reboot the device will automatically login into the lxde desktop.

3.13.3 Auto Start a Program under LXDE

To auto start a program under LXDE, users can edit /*etc/xdg/lxsession/LXDE/autostart* file and add the program that you would like to auto start at the end of this file. Let's take the *firefox* program for example.

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```
<mark>0</mark>lxde-settings
0xscreensaver -no-splash
0lxpanel --profile LXDE
0pcmanfm -d
0firefox -width 800 -height 480
```

After reboot, you will see the Firefox program auto start at the top of the panel.

Note:

If users don't even need LXDE to auto start the program, you will need to modify the */etc/alternatives/x-session-manager* to auto start the program and comment out the LXDE auto start script.

3.14 NAND Root File System

The *linuxrc* file in the NAND flash determines where the root file system should boot into. This section mainly introduces the NAND file system.

3.14.1 linuxrc

The *linuxrc* is a program that is started in the start-up stage of the kernel prior to the actual boot process. This allows you to boot a small modularized kernel and to load the few drivers that are really needed as modules. *linuxrc* assists in loading relevant drivers manually.

The use of *linuxrc* provides with the choices to boot into a small root file system in NAND or the Ubuntu 9.04 system in SD card. (If no press anything, the default is set to boot into SD card.)

The *linuxrc* file is located in the NAND flash. User can edit it if they purely want to use NAND flash as their main root file system. There are two ways to access *linuxrc*.

First, if user boot into SD Ubuntu file systems, the NAND flash will be mounted automatically. And user can just access the file that is located at */nand* directory.

ubun	tu@ub	untu:/\$ cd /	nand				
ubun	tu@ub	untu:/nand\$	ls				
bin	etc	linuxrc	mnt	root	selinux	tmp	var
dev	lib	lost+found	proc	sbin	sys	usr	
ubun	tu@ub	untu:/nand\$					

Second, users can boot in NAND flash first by pressing *2) NAND* during the booting process. (The root pass is *apc7110* by default.) The *linuxrc* file is located at / directory. The NAND file system is also an EXT3 file system. Users can edit the file just you do in any Linux PC.

[root@apc7110 /]# ls					
bin etc linuxrc	mnt	root	selinux	tmp	var
dev lib lost+found	proc	sbin	sys	usr	
[root@apc7110 /]# 📕					

3.14.2 As a rescue file system

The NAND file system can play a role of rescue file system, especially when the main Ubuntu file system is corrupted or cannot boot into for some reason. Here we would like to give you a guide to restore the SD Ubuntu file system from NAND file system.

- 1. Boot into NAND flash first by pressing *2) NAND* during booting process and login as *root* privilege. (The root pass is *apc7110* by default.)
- Prepare for a at least 1GB SD/SDHC card. The SDHC card will have better read/write performance, but usually the SDHC card is at least 4GB.
- The NAND file system will mount partition 1 of SD card by default (The device descriptor of SD device is /dev/mmc0, and the partition 1 of SD card is /dev/mmc1). Here would like to format the partition 1 of SD card as EXT3 first.

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```
[root@apc7110 ~]# mkfs -t ext3 /dev/mmc1
mke2fs 1.37 (21-Mar-2005)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
488640 inodes, 977263 blocks
48863 blocks (5.00%) reserved for the super user
First data block=0
30 block groups
32768 blocks per group, 32768 fragments per group
16288 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done
This filesystem will be automatically checked every 38 mounts or
180 days, whichever comes first. Use tune2fs -c or -i to override.
[root@apc7110 ~]#
```

4. Mount the partition 1 of the SD card as /mnt

[root@apc7110 ~]# mount -t ext3 /dev/mmc1 /mnt
[root@apc7110 ~]#

5. Changing directory to /mnt

[root@apc7110 ~]# cd /mnt

6. Ftp the rootfs tarball into this directory. Let's assume that the root file system is located at 192.168.1.10 ftp server.

```
[root@apc7110 /mnt]# ftp 192.168.1.10
Connected to 192.168.1.10.
220 (vsFTPd 2.0.3)
Name (192.168.1.10:root): eric
331 Please specify the password.
Password:
230 Login successful.
Remote system type is UNIX.
Using binary mode to transfer files.
ftp> get ubuntu.20090701.tar.gz
200 PORT command successful. Consider using PASV.
150 Opening BINARY mode data connection for ubuntu.20090701.tar.gz (240987447 by
tes).
226 File send OK.
240987447 bytes received in 77.1 seconds (3124731 bytes/s)
```

7. Extract this tarball (You might need to set the system time by *date* command first.)

[root@apc7110 /mnt]# tar xvfz ubuntu.20090701.tar.gz

8. remove the tarball

[root@apc7110 /mnt]# rm ubuntu.20090701.tar.gz

9. cd ../

10. umount /mnt 11. Reboot

[root@apc7110 /mnt]# cd ../ [root@apc7110 /]# umount /mnt [root@apc7110 /]# shutdown now -r Why?

You will see the gdm login screen appear on the LCD screen.

3.14.3 As a small root file system

At development stage, it is recommended that user develop their program under SD Ubuntu root file system. Users can *apt-get install gcc* and use *gcc* to do natively make first. After development work done, you can copy the new binary files to NAND flash and do the test again. And then modify the *linuxrc* to boot into NAND flash only.

The other alternative is to use the cross compiler to develop your application at PC. After you done the development, you can ftp the program into the NAND flash and make a test. You can also do this way when developing your program at SD Ubuntu file system.

3.15 Cross Toolchain

For kernel compile, since it doesn't rely on any libraries and is totally independent, we do suggest use this cross-compile tool that could save lots of time, and no problem at all for applications.

For applications, we do suggest you switch to native compile mode since the host pc which used to make the s/w doesn't know the s/w environment of target platform. User can get the gcc 4.2 at device from Ubuntu repository by

apt-get install gcc

IF YOU ARE USING UBUNTU ROOTFS, WE STRONGLY SUGGEST USE NATIVE COMPILE MODE, at least, at the final stage of test.

The crosss toolchain version that we are using is 4.2.2 with EABI supported.

The file name is cross-4.2.2-eabi.tar.bz2 that can be downloaded from Embedian FTP site.

3.15.1 Installing Toolchain

Building the tool chain is not a trivial exercise and for most common situations pre-built tool chains already exists. Unless you need to build your own, or you want to do it anyway to gain a deeper understanding, then simply installing and using a suitable ready-made tool chain is strongly recommended.

Please follow the commands below and install the toolchain in the directory mentioned below:

mkdir -p /usr/local/arm
tar jxvf cross-4.2.2.-eabi.tar.bz2

The above command will generate the **4.2.2-eabi** folder under the same directory as you made the commands. Move this folder to **/usr/local/arm** directory.

mv 4.2.2-eabi /usr/local/arm/ # export PATH=\$PATH:/usr/local/arm/4.2.2-eabi/bin

As of now, you have installed the cross toolchain into your Linux PC. At your application that you would like to cross complied, you need to modify the *Makefile* and point the CROSS_COMPILE to

CROSS_COMPILE = /usr/local/arm/4.2.2-eabi/bin/arm-linux-

Chapter

Use MXM-6410/APC-6410 Hardware MFC Multimedia Function

This Chapter gives how to use the hardware MFC multimedia function. Section include :

- MPEG4 Decoder for Mplayer at Device
- MFC Device Driver's API

Chapter 4 Use MXM-6410/APC-6410 Hardware MFC Multimedia Function

This Chapter gives topics related to hardware MFC multimedia function in MXM-6410/APC-6410.

4.1. MPEG4 Decoder for Mplayer at Device

Embedian integrates the CPU MFC hardware codec into Mplayer and natively supports MPEG4 DivX **DX50** and MPEG4 **Xvid** standard. Any video files that generated by a software encoder that supports these standards can be decoded by the hardware decoder supported Mplayer.

4.1.1. Mplayer running on top of GDM and LXDE At "Start" → "Audio & Video", Click "Mplayer"



Add the file to the play list,

🚾 root's X desktop (ubunt	u:1)				
🖀 🗈 🚱 🔂 📾 🏨	Ctrl Alt 📴 🖳	X			
A-		Playli	st		
Ny Documents	Directory tree	Add	Files Xauthority .bash_history .bashrc .dmrc .gksulock .sudo_as_admin_successful .virninfo .xsession-errors test.avi Selected files test.avi	00 - test File 00:00:00 00:00% b	0/00:00:00 al:50:00% MPLAYER
		MPlayer	MPlayer - Video	🗂 Playlist	15:45 💻 🕻

Click the triangle sign on panel to play the video.



4.1.2. Mplayer Running on top of frambuffer directly

The previous example of Mplayer is running on top of X. Mplayer can also be played directly on top of frame buffer. If that is the case,



Note:

-quite parameter is highly recommended.

-fs means full screen

-vo to fbdev means to show video on top of frame buffer directly.

-Section 3.13.1 also has an example to demonstrate howto.

4.2. MFC Device Driver's API

API Functions	Description			
CreateFile	Create the MXM-6410 MFC instance.			
	IOCTL_MFC_MPEG4_DEC_INIT			
	IOCTL_MFC_MPEG4_ENC_INIT			
	IOCTL_MFC_MPEG4_DEC_EXE			
	IOCTL_MFC_MPEG4_ENC_EXE			
	IOCTL_MFC_H264_DEC_INIT			
	IOCTL_MFC_H264_ENC_INIT			
	IOCTL_MFC_H264_DEC_EXE			
DeviceloControl	IOCTL_MFC_H264_ENC_EXE			
	IOCTL_MFC_H263_DEC_INIT			
	IOCTL_MFC_H263_ENC_INIT			
	IOCTL_MFC_H263_DEC_EXE			
	IOCTL_MFC_H263_ENC_EXE			
	IOCTL_MFC_VC1_DEC_INIT			
	IOCTL_MFC_VC1_DEC_EXE			
	IOCTL_MFC_GET_LINE_BUF_ADDR			
	IOCTL_MFC_GET_RING_BUF_ADDR			
	IOCTL_MFC_GET_FRAM_BUF_ADDR			
CloseHandle	Close the 6410 MFC instance.			

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4.2.1. CreateFile

CreateFile	
Syntax	HANDLE WINAPI CreateFile(
	LPCTSTR lpFileName,
	DWORD dwDesiredAccess,
	DWORD dwShareMode,
	LPSECURITY_ATTRIBUTES lpSecurityAttributes,
	DWORD dwCreationDisposition,
	DWORD dwFlagsAndAttributes,
	HANDLE hTemplateFile
);
Description	This function creates the 6410 MFC instance. Several MFC
	instance can be made simultaneously. This means that
	CreateFile function can be called several times in a process
	(task).
Parameters	IpFileName [IN] : MFC's device driver name. (L"MFC1:")
	dwDesiredAccess [IN] : GENERIC_READ GENERIC_WRITE
	dwShareMode [IN] : 0
	IpSecurityAttributes [IN] : NULL
	dwCreationDisposition [IN] : OPEN_EXISTING
	dwFlagsAndAttributes [IN] :
	FILE_ATTRIBUTE_NORMAL
	hTeplateFile [IN] : NULL
Returns	HANDLE of the MFC instance.
	If it fails, it returns INVALID_HANDLE_VALUE.

4.2.2. DeviceloControl

DeviceloCon	ntrol (
Syntax	BOOL WINAPI DeviceIoControl(
	HANDLE hDevice,
	DWORD dwloControlCode,
	LPVOID lpInBuffer,
	DWORD nInBufferSize,
	LPVOID lpOutBuffer,
	DWORD nOutBufferSize,
	LPDWORD lpBytesReturned,
	LPOVERLAPPED IpOverlapped
);
Description	Most of functions are developed in ioctl. This system call has
	many functions which is separated by dwloControlCode
Parameters	hDevice [IN] : HANDLE returned by CreateFile() function
	dwloControlCode [IN] : The control code for the operation.
	Detailed information will explain below.
	IpInBuffer [IN] : Structure of the MFC argument
	nInBufferSize [IN] : Size of MFC argument structure
	IpOutBuffer [OUT] : NULL
	nOutBufferSize [OUT] : 0
	IpBytesReturned [OUT] : NULL
	IpOverlapped [IN] : NULL
Returns	If the operation completes successfully, the return value is
	nonzero.
	If the operation fails or is pending, the return value is zero.

4.2.3. CloseHandle

CloseHandle	
Syntax	BOOL WINAPI CloseHandle(
	HANDLE hDevice
);
Description	Closes an open MFC's handle.
Parameters	[IN] hDevice - HANDLE returned by CreateFile() function
Returns	If the function succeeds, the return value is nonzero.
	If the function fails, the return value is zero

4.2.4. Control	Codes f	for Device	loControl()

IOCTL_MFC_MPEG4_DEC_INIT	
IOCTL_MFC_H263_DEC_INIT	
IOCTL_MFC_H264_DEC_INIT	
IOCTL_MFC_VC1_DEC_INIT	
Syntax	BOOL WINAPI DeviceIoControl(
	HANDLE hDevice,
	DWORD dwloControlCode,
	LPVOID lpInBuffer,
	DWORD nInBufferSize,
	LPVOID lpOutBuffer,
	DWORD nOutBufferSize,
	LPDWORD lpBytesReturned,
	LPOVERLAPPED IpOverlapped
);
Description	It initializes the MFC's instance with the configure stream.
Parameters	hDevice [IN] : HANDLE returned by CreateFile() function
	dwIoControlCode [IN] : IOCTL_MFC_MPEG4_DEC_INIT,
	IOCTL_MFC_H263_DEC_INIT,
	IOCTL_MFC_H264_DEC_INIT,
	IOCTL_MFC_VC1_DEC_INIT
	IpInBuffer [IN] : Pointer to MFC_DEC_INIT_ARG structure.
	nInBufferSize [IN] : sizeof(MFC_DEC_INIT_ARG)
	IpOutBuffer [OUT] : NULL
	nOutBufferSize [OUT] : 0
	IpBytesReturned [OUT] : NULL
	IpOverlapped [IN] : NULL
Returns	If the operation completes successfully, the return value is
	nonzero.
	If the operation fails or is pending, the return value is zero.
IOCTL_MFC	_MPEG4_DEC_EXE
-------------	---
IOCTL_MFC	_H263_DEC_EXE
IOCTL_MFC	_H264_DEC_EXE
IOCTL_MFC	_VC1_DEC_EXE
Syntax	BOOL WINAPI DeviceIoControl(
	HANDLE hDevice,
	DWORD dwloControlCode,
	LPVOID lpInBuffer,
	DWORD nInBufferSize,
	LPVOID lpOutBuffer,
	DWORD nOutBufferSize,
	LPDWORD lpBytesReturned,
	LPOVERLAPPED IpOverlapped
);
Description	It decodes the stream in the LINE_BUF or RING_BUF.
Parameters	hDevice [IN] : HANDLE returned by CreateFile() function
	dwloControlCode [IN] : IOCTL_MFC_MPEG4_DEC_EXE,
	IOCTL_MFC_H263_DEC_EXE,
	IOCTL_MFC_H264_DEC_EXE,
	IOCTL_MFC_VC1_DEC_EXE
	IpInBuffer [IN] : Pointer to MFC_DEC_EXE_ARG structure.
	nInBufferSize [IN] : sizeof(MFC_DEC_EXE_ARG)
	IpOutBuffer [OUT] : NULL
	nOutBufferSize [OUT] : 0
	IpBytesReturned [OUT] : NULL
	IpOverlapped [IN] : NULL
Returns	If the operation completes successfully, the return value is
	nonzero.
	If the operation fails or is pending, the return value is zero.

IOCTL_MFC	_GET_LINE_BUF_ADDR
IOCTL_MFC	_GET_RING_BUF_ADDR
IOCTL_MFC	_GET_FRAM_BUF_ADDR
Syntax	BOOL WINAPI DeviceIoControl(
	HANDLE hDevice,
	DWORD dwloControlCode,
	LPVOID lpInBuffer,
	DWORD nInBufferSize,
	LPVOID lpOutBuffer,
	DWORD nOutBufferSize,
	LPDWORD lpBytesReturned,
	LPOVERLAPPED IpOverlapped
);
Description	It obtains the address of the LINE_BUF, RING_BUF or
	FRAM_BUF.
Parameters	hDevice [IN] : HANDLE returned by CreateFile() function
	dwloControlCode [IN] :
	IOCTL_MFC_GET_LINE_BUF_ADDR,
	IOCTL_MFC_GET_RING_BUF_ADDR,
	IOCTL_MFC_GET_FRAM_BUF_ADDR
	IpInBuffer [IN] : Pointer to MFC_GET_BUF_ADDR_ARG
	structure.
	nInBufferSize [IN] : sizeof(MFC_GET_BUF_ADDR_ARG)
	IpOutBuffer [OUT] : NULL
	nOutBufferSize [OUT] : 0
	IpBytesReturned [OUT] : NULL
	IpOverlapped [IN] : NULL
Returns	If the operation completes successfully, the return value is
	nonzero.
	If the operation fails or is pending, the return value is zero.

4.2.5. Data Structure for Passing the IOCTL Arguments 4.2.5.1. MFC_ENC_INIT_ARG

MFC_ENC_INIT_ARG	
int ret_code	[OUT] Return code
int in_width	[IN] width of YUV420 frame to be encoded
int in_height	[IN] height of YUV420 frame to be encoded
int in_bitrate	[IN] Encoding parameter: Bitrate (kbps)
int in_gopNum	[IN] Encoding parameter: GOP Number (interval of
	I-frame)
int in_frameRateRes	[IN] Encoding parameter: Frame rate (Res)
int in_frameRateDiv	[IN] Encoding parameter: Frame rate (Divider)

4.2.5.2. MFC_ENC_EXE_ARG

MFC_ENC_EXE_ARG	
int ret_code	[OUT] Return code
int out_encoded_size	[OUT] Length of Encoded video stream

4.2.5.3. MFC_DEC_INIT_ARG

MFC_DEC_INIT_ARG	
int ret_code	[OUT] Return code
int in_strmSize	[IN] Size of video stream filled in STRM_BUF
int out_width	[OUT] width of YUV420 frame
int out_height	[OUT] height of YUV420 frame

4.2.5.4. MFC_DEC_EXE_ARG

MFC_DEC_EXE_ARG	
int ret_code	[OUT] Return code
int in_strmSize	[IN] Size of video stream filled in STRM_BUF

MFC_DEC_INIT_ARG	
int ret_code	[OUT] Return code
int in_usr_data	[IN] User data for translating Kernel-mode address
	to Usermode address
int out_buf_addr	[OUT] Buffer address
int out_buf_size	[OUT] Size of buffer address

4.2.5.5. MFC_GET_BUF_ADDR_ARG

Appendix

MXM-6410/APC-6410 Firmware Update

This Chapter details how to update firmware in NAND flash.

Section include :

- Firmware Architecture
- Update Firmware from Uboot

Appendix I MXM-6410/APC-6410 Firmware Update

This Chapter details firmware upgrade for MXM-6410/APC-6410. The firmware in NAND flash includes uboot, kernel zImage and nandfs image.

A.1. Firmware Architecture

Figure A.1 shows the firmware architecture of Linux in NAND.



Figure A.1 Firmware Architecture of Linux n NAND

The u-boot starts from NAND address 0x0. The Linux kernel zImage starts from NAND address 0x40000. The NAND filesystem is a small file system for rescue purposed and load the minimum set drivers and starts from the NAND address 0x200000.

Users need a SD card or hard drive with root file system installed to boot up the complete Ubuntu 9.04 system. The will be described at **Backup and Restore Root File Systems** document.

Users can update the firmware under u-boot. The Embedian factory default is fimware pre-installed. Unless necessary, Embedian doesn't recommend you

update firmware (especially uboot) since the system might not boot anymore if you did wrong operation. (If you develop your own u-boot and kernel, you will need to do that.) Following tells howto update firmware from uboot command prompt..

A.2. Update Firmware from Uboot

You could use u-boot tftp command to download u-boot, Linux kernel and NAND root file system. Below we will tell you how to do this under Windows and Linux PC environment. First, you need to set up a tftp server.

A.2.1. Windows Environment

First, open up "**DNW**" program or Windows Hyperterminal and set up the serial port (115200, 8N1).

A.2.1.1. Setup TFTP Server

Users need to install tftp server on Windows. You can download the freeware and install to your Windows PC in the **tftpboot** directory. Copy the **uboot.bin**, **zImage** and **nand.img** into this directory. Close your anti-virus software like PC-cillin. (Or close port 69)

You can set and add the environment parameter of device using "**setenv**", "**saveenv**" command as below.

setenv ipaddr XXX.XXX.XXX.XXX # setenv serverip XXX.XXX.XXX.XXX # saveenv

Following figure shows the example for setting up the parameters.

EXAMPLE: Ipaddr 192.168.1.2 Serverip 192.168.1.121

Note:

Make sure that the *ipaddr* for MXM-6410/APC-6410 and *serverip* for Windows PC are in the same network domain.

After setting up the IP address and wire everything right, you could start the tftp download.

A.2.1.2. Transfer and Write Image by TFTP and "nand write" Command After setting up the tftp server and IP address of devices, users can start transfer and write images using u-boot *tftp* and *nand write* command. It is necessary to download to DRAM first before writing to NAND. The following command shows how to transfer **u-boot.bin** images to DRAM.

tftp 0x 5000000 u-boot.bin

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **u-boot.bin** image to the NAND by using following *nand write* command. You need to erase first.

nand erase 0x0 0x40000 # nand write 0x50000000 0x0 0x40000

Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x0. Image size of bootloader will be below 0x40000 (HEX).

Note: Uboot contains specific hardware information and is well configured by Embedian.. It is usually no need to modify. Unless necessary or you are an experienced engineer, it is not recommended to update uboot. Wrong operation will cause the system not booting anymore.

Next example shows how to transfer and write Linux kernel. The file name is "**zImage**". Again, we tftp zImage to DRAM first by the following command.

tftp 5000000 zImage

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **zImage** image to the NAND by using *nand write* command. The same, you will need to erase first.

nand erase 0x40000 0x1c0000
nand write 0x50000000 0x40000 0x1c0000

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Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x40000. Image size of zImage will be below 0x1c0000 (HEX).

After writing u-boot and kernel images to NAND flash, the last step is to write NAND root file system **nand6410.img** image. Repeat the same steps, first, we tftp the nand.img image to DRAM.

tftp 5000000 nand6410.img

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **nand6410.img** image to the NAND by using following *nand write* command. You still need to erase first.

nand erase 0x200000 0x7e00000
nand write 0x5000000 0x200000 0x7e00000

Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x200000 (40000+1c0000). Image size of NANDFS will be below 0x7e00000 (HEX).

Note: The mobile DDR size is 128MB only. If your NANDFS size is big (like Embedian default nand6410.img), you need to use *split* command in Linux to split the NANDFS into two smaller files, or the uboot will be overwritten in DDR because the execution point of uboot is somewhere in DDR.

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After done, reset MXM-6410/APC-6410 and the firmware will be updated.

A.2.2 Linux Environment

In this section, we will detail how to transfer and write firmware under Linux PC. First, we need to set up minicom so that we could see the message from the console.

A.2.2.1. Minicom

Before transferring images using tftp, you should know how to use Minicom so that you could see the messages from console. In this section will explain how to setup Minicom.

Desktop Linux has Minicom program for serial communication. It is used for command prompt of u-boot.bin or shell prompt of embedded Linux.

Set up the values before using Minicom program. To execute minicom on setting mode:

[root@localhost root] # minicom -s

Figure A.2 Minicom Setup

$\mathbf{\nabla}$					root@localh	ost:~		//////////////	
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew F: F: So M(S) S3 S3 S3 S3 S3 S3 S3 S3 S3 S3 S3 S3 S3	<u>T</u> erminal <u> [confi</u> ilenames ile trans erial por odem and creen and creen and ave setup ave setup xit xit from	<u>G</u> o gura and j fer j dial: key as o as.	root@localh Help paths protocols tup board dfl	ost:~			
		E	xit from	Mini	com		 		×

Please select 'Serial port setup' Push 'A' key for setting 'Serial Device', then write serial port which is connected to MXM-6410/APC-6410. (If you are using COM1, write /dev/ttyS0, if COM2, write /dev/ttyS1.)

Figure A.3 Serial Port Setup I



Push '*E*' key for setting up '*Bps/Par/Bits*'. Push '*I*' to set up '*bps*' to 115200, Push '*V*' to set up '*Data bits*' to 8, Push '*W*' to set up '*Stop bits*' to '*1*', and '*V*' to set up '*parity*' to '*NONE*'.

			root@	localhost:~		//////==×
<u>F</u> ile	<u>E</u> dit <u>V</u> i	ew <u>T</u> ermi	nal <u>G</u> o <u>H</u> elp			
						*
			[0	D		
			[0	omm Parametersj—		
	А –	Serial	Current: 115	200 8N1		
	B - Loo	ckfile L				
	C – (Callin P	Speed	Parity	Data	
	D – Ca	allout P				
	E -	Bps/Par	A: 300	L: None	S: 5	
	F - Hai	raware F Etwaro F	B: 1200	M: Even	1:6	
	G - 301	ltware r	D: 4800	0: Mark	V· 8	
	Char	nge whic	E: 9600	P: Space	1. 0	
		-8	F: 19200		Stopbits	
		Screen	G: 38400		Ŵ: 1	
		Save s	H: 57600		X: 2	
		Save s	I: 115200	Q: 8-N-1		
		Exit	J: 230400	R: 7-E-1		
		Exit f				
			Choice. or <	Enter> to exit?		
			choice, or a	inter, to care.		
						2
						¥

Figure A.4 Serial Port Setup II

Push '*F* key for setting up '*Hardware Flow Control*' to '*NO*'. Push '*G*' key for setting up '*Software Flow Control*' to '*NO*'. The default value is '*NO*'.

\bigcirc			root@localhost:~	
<u>F</u> ile	<u>E</u> dit <u>V</u> ie	w <u>T</u> erminal	<u>G</u> o <u>H</u> elp	
				^
	A –	Serial Devi	ice : /dev/ttyS0	
	B - Loc	kfile Locat	tion :	
	D - Ca	llout Progr	ram :	
	E -	Bps/Par/Bit	ts : 115200 8N1	
	F - Har G - Sof	dware Flow tware Flow	Control : No Control : No	
			_	
	Chan	ge which se	etting?	
		Screen and	d keyboard	
		Save setur	p as dfl	
		Exit	p us	
		Exit from	Minicom	
				¥

Figure A.5 Hardware/Software Flow Control Setup

Once setting is over, please press '*Enter*' key. And select '*Save setup as dfl*' item, then press '*Enter*' for saving the values.

<u>File Edit View Terminal Go H</u> elp						root@loo	alhost:~			×
[configuration] Filenames and paths File transfer protocols Serial port setup Modem and dialing Screen and keyboard Save setup as dfl Save setup as Exit Exit from Minicom	<u>File</u>	<u>E</u> dit <u></u>	<u>V</u> iew Fi Fi Se Mo Sc Sa Ex	<u>T</u> erminal —[confi lenames le trans rial por dem and reen and ve setup ve setup tit cit from	<u>G</u> o gura and j fer j t se dial: key as. Mini	tion] <u>H</u> elp paths protocols tup ing board dfl com				

Figure A.6 Saving Minicom Setup

Push '*Exit*' key, to exit from the setting mode. Currently, the set points are stored to the file '*/etc/minirc.dfl*'.

root@localhost:~
File Edit View Terminal Go Help File Configuration] Filenames and paths File transfer protocols Serial port setup Modem and dialing Screen and keyboard Save setup as Exit Exit from Minicom

Figure A.7 Exiting Minicom Setup

To quit from **Minicom**, please press '*Ctrl* + A' and then 'Z', at last push 'Q' key. Then Selecting 'Yes', **Minicom** is quitted.

Figure A.8 Resetting from Minicom

A.2.2.2. TFTP server

To use tftp server program you have to setup your computer by executing the following command.

[root@localhost root]# setup

You can see the "*Text Mode Setup Utility*" as shown below.

				ro	ot@localhos	st:/home/test			////// - •	X
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>T</u> erminal	<u>G</u> o	<u>H</u> elp					
Text	Mode	Setup	Utility	1.13			(c) 1999–20	02 Red Hat	, 🔺
					Choose a	a Tool 🕂 🚽		1		
				uthe	ntication	configurati	on			
			I	irew	all config	guration				
				louse Jetwo	configura rk configu	ation uration				
			I	rint	er configu	iration				
				Syste Sound	n services card cont	s figuration	_			
			1	imez	one config	guration				
				_						
					Run Tool	Ouit				
							I			
	<tab>/</tab>	/ <alt-1< th=""><th>Tab> beta</th><th>reen</th><th>elements</th><th>Use <e< th=""><th>inter></th><th>to edit a</th><th>selection</th><th>-</th></e<></th></alt-1<>	Tab> beta	reen	elements	Use <e< th=""><th>inter></th><th>to edit a</th><th>selection</th><th>-</th></e<>	inter>	to edit a	selection	-

Figure A.9 Text Mode Setup Utilities

Please select "System services". As shown below.



Please select "*tftp*" service as shown in above figure and finally click on "*ok*".

Finally "quit" setup utility and execute the following command.

[root@localhost root]# xinetd -restart

Now you can download compiled images to the MXM-6410/APC-6410 by using **tftp**. Before downloading the images, connect host PC and MXM-6410/APC-6410 by Ethernet cable. (If you direct link PC and device, please use Ethernet cross cable.)

To download binary image files to MXM-6410/APC-6410, run tftp server service on your computer and put images in */tftpboot* directory.

Copy u-boot, kernel *zImage* and *nand.img* image to */tftpboot* directory. In Linux PC, type

[root@localhost]# cp uboot.bin /tftpboot/

[root@localhost]# cp zImage /tftpboot/

And

[root@localhost]# cp nand6410.img /tftpboot/

A.2.2.3. Setting up an IP address

Setting up an IP address helps in downloading the compiled images to MXM-6410/APC-6410.

Connect host PC and MXM-6410/APC-6410 by Ethernet cable.

A.2.2.3.1. Setting IP address for host PC

On Your Linux Host PC, run the terminal and execute following commands to set up and IP address.

[root@localhost tftpboot]# ifconfig eth0 down [root@localhost tftpboot]# ifconfig eth0 192.168.1.10 netmask 255.255.255.0 up

[root@localhost tftpboot]# ifconfig

Figure A.11 Setting IP address for host PC

root@localhost:/tftpboot	IX
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>T</u> erminal <u>G</u> o <u>H</u> elp	
<pre>[root@localhost tftpboot]# ifconfig eth0 down [root@localhost tftpboot]# ifconfig eth0 192.168.1.10 netmask 255.255.255.0 up [root@localhost tftpboot]# ifconfig eth0 Link encap:Ethernet HWaddr 00:03:47:B0:92:7E inet addr:192.168.1.10 Bcast:192.168.1.255 Mask:255.255.255.0 UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1 RX packets:1914709 errors:16 dropped:0 overruns:0 frame:16 TX packets:1703888 errors:100 dropped:0 overruns:0 carrier:100 collisions:40165 txqueuelen:1000 RX bytes:312583130 (298.1 Mb) TX bytes:927285406 (884.3 Mb) Interrupt:10 Base address:0x2400 Memory:c9200000-c9200038</pre>	4
<pre>lo Link encap:Local Loopback inet addr:127.0.0.1 Mask:255.0.0.0 UP LOOPBACK RUNNING MTU:16436 Metric:1 RX packets:3947 errors:0 dropped:0 overruns:0 frame:0 TX packets:3947 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:0 RX bytes:3917086 (3.7 Mb) TX bytes:3917086 (3.7 Mb)</pre>	
[root@localhost tftpboot]#	¥.

A.2.2.3.2. Setting IP address for MXM-6410/APC-6410

Run the *Minicom* first in your host PC and power on MXM-6410/APC-6410.

Please press any key to enter uboot command prompt.

Execute the command "printenv".

You can set and add the environment parameter of MXM-6410/APC-6410 using "*setenv*", "*saveenv*" command as below.

setenv ipaddr XXX.XXX.XXX.XXX
setenv serverip XXX.XXX.XXX.XXX
saveenv

Following shows the example for setting up the parameters.

EXAMPLE: ipaddr 192.168.1.121 serverip 192.168.1.2

Note:

Make sure that the *ipaddr* is for MXM-6410/APC-6410 and *serverip* is for Linux PC are in the same network domain.

After you configure the network for Host PC and MXM-6410/APC-6410, the LED of the Ethernet jack will be on. It shows that the network connection has been successfully done.

A.2.2.4. Transfer and Write Image by TFTP and "nand write" Command After setting up the tftp server and IP address of devices, users can start transfer and write images using u-boot *tftp* and *nand write* command. It is necessary to download to DRAM first before writing to NAND. The following command shows how to transfer **u-boot.bin** images to DRAM.

tftp 0x 5000000 u-boot.bin

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **u-boot.bin** image to the NAND by using following *nand write* command. You need to erase first.

nand erase 0x0 0x40000
nand write 0x50000000 0x0 0x40000

Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x0. Image size of bootloader will be below 0x40000 (HEX).

Note: Uboot contains specific hardware information and is well configured by Embedian.. It is usually no need to modify. Unless necessary or you are an experienced engineer, it is not recommended to update uboot. Wrong operation will cause the system not booting anymore.

Next example shows how to transfer and write Linux kernel. The file name is "**zImage**". Again, we tftp zImage to DRAM first by the following command.

tftp 5000000 zImage

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **zImage** image to the NAND by using *nand write* command. The same, you will need to erase first.

nand erase 0x40000 0x1c0000
nand write 0x50000000 0x40000 0x1c0000

Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x40000. Image size of zImage will be below 0x1c0000 (HEX).

After writing u-boot and kernel images to NAND flash, the last step is to write NAND root file system **nand6410.img** image. Repeat the same steps, first, we tftp the nand.img image to DRAM.

tftp 5000000 nand6410.img

Temporary address is base address of DRAM, i.e. 0x50000000. Write the **nand6410.img** image to the NAND by using following *nand write* command. You still need to erase first.

nand erase 0x200000 0x7e00000
nand write 0x5000000 0x200000 0x7e00000

Temporary address is base address of DRAM, i.e. 0x50000000. Start NAND address is 0x200000 (40000+1c0000). Image size of NANDFS will be below 0x7e00000 (HEX).

Note: The mobile DDR size is 128MB only. If your NANDFS size is big (like Embedian default nand6410.img), you need to use *split* command in Linux to split the NANDFS into two smaller files, or the uboot will be overwritten in DDR because the execution point of uboot is somewhere in DDR.