

Linux on the Orange Pi Plus Dev Board

BV

[2015-07-12 Sun 17:12]

I ordered an Orange Pi Plus dev board from AliExpress to test for use as a Little Projector Computer.

1 Introduction

1.1 Ordering

This was the first time to order from AliExpress. The source had didn't have enough in the pipeline so had to ask for a one week delay. Since nominally it takes about a month this was no biggie. It arrived fine and AliExpress shopping "experience" was not bad. They even notified me by email it was sitting in my mail box before I knew about it.

1.2 Initial boot

Cable it up, plug it in. It boots to Android into an XBMC-like interface and all in Chinese. It's fairly easy to navigate the Android Settings menus to find the English setting (look for the icon of a white box with a black "A" about half-way down). It connected to the home WPA2 wifi no problem, found an open NFS share (oops) and was able to play a video with no problem.

The "phone" identifies as model "dolphin", has Android 4.4.2, Linux 3.4.39. Build by "steven" who is also who I dealt with when ordering it. What a one man shop!? Processor type unknown. It comes with various Android apps, about half with a Chinese title but they are mostly self explanatory.

2 Linux

But enough of Android, I want "real" Linux and of the Debian flavor. OPi has these instructions to follow.

2.1 Prepare microSD card

Download from OPi's Google Drive (!) as linked in the instructions. No checksums are given that I can see, but this is what I downloaded.

```
$ ls -lh *.xz
-rw-rw-r-- 1 bv bv 846M Jul 12 17:15 Lubuntu_1404_For_OrangePiplus_v0_8_0_.img.xz
-rw-rw-r-- 1 bv bv 284M Jul 12 17:09 orangepi-plus-debian-server-card-v0.9.img.xz
$ sha1sum *.xz
05247aa7f9e09cde3c0de9c9f34f97fa01eb0d6a  Lubuntu_1404_For_OrangePiplus_v0_8_0_.img.xz
db8ae191e4f7cf556efaf29e51fd83361d957d01  orangepi-plus-debian-server-card-v0.9.img.xz
$ md5sum *.xz
7d9fe5e2bfc06b266c62d4882b9bc106  Lubuntu_1404_For_OrangePiplus_v0_8_0_.img.xz
68ca3fa0f766b1185a7ca12e274d7a50  orangepi-plus-debian-server-card-v0.9.img.xz
```

After running unxz on them.

```
$ md5sum orangepi-plus-debian-server-card-v0.9.img
3c4fd92f8a16d165273f70950ff4c159  orangepi-plus-debian-server-card-v0.9.img
6c1e205c05fdd50bd629d030673efe0dd48664cd  orangepi-plus-debian-server-card-v0.9.img
$ ls -l orangepi-plus-debian-server-card-v0.9.img
-rw-rw-r-- 1 bv bv 969932800 Jul 12 17:09 orangepi-plus-debian-server-card-v0.9.img

$ ls -l Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
-rw-rw-r-- 1 bv bv 3670016000 Jul 12 17:15 Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
$ md5sum Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
b07dfd045eb064910073226edf20541d  Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
$ sha1sum Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
5340fd6dfb8fafc5a4336288a8ac32f56322d61a  Lubuntu_1404_For_OrangePiplus_v0_8_0_.img
```

The instructions say to format the SD card, but since eventually the image is written directly to the main device this seem superfluous.

Stick an 8GB microSD card In the Thinkpad's memory slot:

```
# dd bs=4M if=orangepi-plus-debian-server-card-v0.9.img of=/dev/mmcblk0 ; sync
231+1 records in
231+1 records out
969932800 bytes (970 MB) copied, 127.03 s, 7.6 MB/s
# dd bs=4M if=Lubuntu_1404_For_OrangePiplus_v0_8_0_.img of=/dev/mmcblk0 ; sync
875+0 records in
875+0 records out
3670016000 bytes (3.7 GB) copied, 693.245 s, 5.3 MB/s
```

2.2 Other images

The community behind Orange Pi is not large. This forum post gives links to Debian Jessie and Ubuntu Vivid images (including MATE!). They are for Orange Pi 2, not Plus. There is an `update_boot.sh` script that updates to the Plus. It does this by downloading a tar file from here, unpacking it and copying to `/boot` which seems rather dicey. It is meant to be run on the OPI+.

loboris says,

for testing OPI-PLUS, please download `OPI_boot_kernels.tar.gz` from Mega. unpack and read `update_boot_kernel.txt` about how to update.

2.3 Enlarging the image

While the SD card is still in the laptop, but after the image is written, do:

```
$ sudo fdisk /dev/mmcblk0
p
Device            Boot   Start      End  Sectors   Size Id Type
/dev/mmcblk0p1          40960  124927    83968     41M 83 Linux
/dev/mmcblk0p2       124928 7167999 7043072    3.4G 83 Linux
d
2
n
p
2
124928
ENTER (default, full size)
w
```

Eject, reinsert, unmount.

```
$ sudo e2fsck -f /dev/mmcblk0p2
$ sudo resize2fs /dev/mmcblk0p2
resize2fs 1.42.12 (29-Aug-2014)
Resizing the filesystem on /dev/mmcblk0p2 to 1924864 (4k) blocks.
The filesystem on /dev/mmcblk0p2 is now 1924864 (4k) blocks long.
```

Eject, reinsert, observe 7.9GB, unmount.

2.4 Booting SD card

Not much to go on but starting with the Lubuntu image, stick it into the SD slot and power up. Boost fast! Boots into 1280x720. Comes pre-configured with some WiFi in China and Chromium has some history in it!

3 Building the image

From this post and mega link.

Building the system

You can try to build Debian/Ubuntu for OrangePI yourself.

- Download my scripts package `make_linux.tar.gz` from Mega, unpack to empty directory.
- You will need running Ubuntu or Debian system (you can even run it on OrangePI).
- Before running the script install `debootstrap` and `qemu-user-static` packages.
- Read carefully and edit `params.sh` to adjust the parameters to your needs.
- Run `sudo create_image` to create Ubuntu system. I recommend to build to local directory, then you can run `image_from_dir` to transfer the system to sd card or image.

Here is `params.sh`

```
UIMAGE="orange/uImage_OPI-PLUS"
BL1="orange/boot0_sdcard_OPI-PLUS.fex"
UBOOT="orange/u-boot_OPI-PLUS.fex"
HOSTNAME="lpc"
USER="lpc"
ROOTPASS="lpc"
USERPASS="lpc"
_timezone="Etc/UTC"
_timezone="US/Eastern"
LANGUAGE="en"
LANG="en_US.UTF-8"
```

```

image_name=""
_format="ext4"
fatsize=40
linuxsize=800
distro="vivid"
repo="http://ports.ubuntu.com/ubuntu-ports"
_compress="yes"
_boot_on_ext4="no"

```

Good passwords, huh?

```
$ sudo ./create_image
```

Something during the process turned my Window+Arrow key binding in Sawfish from switching between WM desktops to switching between Linux consoles.

Ends up with this message:

Instalation finished.

Copy files from boot-vivid to SD Card boot partition

e.g. `cp boot-vivid/* <path_to_sdcard_boot_mount>`

and rsync linux-vivid to SD Card ext4 partition.

e.g. `sudo rsync -r -t -p -o -g -x -v --progress --delete -l -H -D --numeric-ids -s /`

Or create SDCard image running:

```
sudo ./image_from_dir linux-vivid <DEVICE|IMAGE>
```

You can chroot into "linux-vivid" to make additional changes:

```
sudo chroot linux-vivid /usr/bin/qemu-arm-static -cpu cortex-a9 /bin/bash
```

```

*****
* AFTER BOOTING:                                     *
* ----- *
* To RESIZE LINUX partition to fill sd card run:      *
*   sudo fs_resize                                   *
* ----- *
* To change the board type / update run:             *
*   sudo update_boot.sh                             *
* ----- *

```

```

* To install desktop run:
* sudo install_lxde_desktop
* or, for better-looking (vivid&jessie)
* sudo install_mate_desktop
* DON'T FORGET TO RESIZE SD CARD IF NECESSARY FIRST
* -----
* To configure your local settings use:
* sudo dpkg-reconfigure tzdata
* sudo dpkg-reconfigure keyboard-configuration
* sudo dpkg-reconfigure console-setup
* # change your system's locale entries by modifying
* # the file /etc/default/locale (e.g. en_US.UTF-8)
* # then run:
* sudo locale-gen <your_locale> (e.g en_US.UTF-8)
* sudo dpkg-reconfigure locales
*****

```

```

$ sudo cp install_mate_desktop linux-vivid/root/
$ sudo cp update_boot.sh linux-vivid/root/
$ sudo ./image_from_dir linux-vivid /dev/mmcblk0
...
Formatting fat partition ...
ERROR formatting fat partition.

```

Adding set -x shows:

```

++ echo 'Formatting fat partition ...'
Formatting fat partition ...
++ mkfs -t vfat -F 32 -n BOOT /dev/mmcblk01
++ '[' 1 -ne 0 ']'
++ echo 'ERROR formatting fat partition.'
ERROR formatting fat partition.
++ exit 0

```

Looks like it assumes `/dev/sdXN` type device names where this device is `/dev/mmcblk0pN`. Instead of fixing the script, just write an image file first and flash that manually.

```

$ sudo ./image_from_dir linux-vivid linux-vivid.img

$ ls -ltr

```

```
-rw-r--r-- 1 root root 20971520 Jul 18 15:22 linux-vivid.img.imgu
-rw-r--r-- 1 root root 41943040 Jul 18 15:23 linux-vivid.img.img1
-rw-r--r-- 1 root root 734003200 Jul 18 15:23 linux-vivid.img.img2
-rw-r--r-- 1 root root 167212352 Jul 18 15:23 linux-vivid.img.img.xz
-rw-r--r-- 1 root root 796917760 Jul 18 15:23 linux-vivid.img.img
-rw-r--r-- 1 root root          54 Jul 18 15:28 linux-vivid.img.img.md5sum
-rw-r--r-- 1 root root          57 Jul 18 15:28 linux-vivid.img.img.xz.md5sum
```

```
$ cat *.md5sum
```

```
9f97b70f10614180e3dd1dd1419fe426  linux-vivid.img.img
3cf38513957f720ddf5dd53f00bf94f8  linux-vivid.img.img.xz
```

```
$ sudo dd bs=4M if=linux-vivid.img.img of=/dev/mmcblk0 ; sync
```

Looks like I didn't need to add the explicit .img.

Boots to an Ubuntu 15.04 Linux console login prompt! Login via SSH/wire get nice warning to resize:

```
$ ssh root@192.168.1.28
```

```
...
```

```
root@lpc:~# fs_resize
```

```
(reboot, log back in)
```

```
root@lpc:~# df -hl /
```

```
Filesystem      Size  Used Avail Use% Mounted on
/dev/mmcblk0p2  7.3G  479M  6.5G   7% /
```

```
root@lpc:~# fdisk -l
```

```
Disk /dev/mmcblk0: 7.4 GiB, 7948206080 bytes, 15523840 sectors
```

```
Units: sectors of 1 * 512 = 512 bytes
```

```
Sector size (logical/physical): 512 bytes / 512 bytes
```

```
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

```
Disklabel type: dos
```

```
Disk identifier: 0x062475c6
```

```
Device          Boot  Start      End  Sectors  Size Id Type
/dev/mmcblk0p1             40960   122879    81920   40M  b W95 FAT32
/dev/mmcblk0p2          122880 15522816 15399937   7.4G  83 Linux
```

What about the internal eMMC? Seems like some rancor in orange pi land due to "Steven" promising and failing.

You can copy your burning firmware image into /home/orangepi/burn-image-to-emmc/
 sudo dd bs=4M if=xxx.img of=/dev/mmcblk1
 xxx.img is your burning firmware image, This need to wait 30 minutes.
 sudo dd if=u-boot-sun8iw7p1.bin of=/dev/mmcblk1 bs=1024 seek=16400

3.1 Latest Lubuntu 0.9.0 image from Steven

This promises to allow writing to internal eMMC

```
$ sudo dd bs=4M if=Lubuntu_1404_For_OrangePiplus_v0_9_0_.img of=/dev/mmcblk0 ; sync
root@orangepi:~# fdisk -l
```

WARNING: GPT (GUID Partition Table) detected on '/dev/mmcblk0'! The util fdisk doesn't

```
Disk /dev/mmcblk0: 7948 MB, 7948206080 bytes
4 heads, 16 sectors/track, 242560 cylinders, total 15523840 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x2b1c25d6
```

Device	Boot	Start	End	Blocks	Id	System
/dev/mmcblk0p1		40960	124927	41984	83	Linux
/dev/mmcblk0p2		124928	15522816	7698944+	83	Linux

```
Disk /dev/mmcblk1: 7838 MB, 7838105600 bytes
1 heads, 16 sectors/track, 956800 cylinders, total 15308800 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000
```

Device	Boot	Start	End	Blocks	Id	System
/dev/mmcblk1p1	*	4923392	15374335	5225472	b	W95 FAT32
/dev/mmcblk1p2		73728	106495	16384	6	FAT16
/dev/mmcblk1p3		1	4816896	2408448	5	Extended
/dev/mmcblk1p5		106496	139263	16384	83	Linux
/dev/mmcblk1p6		139264	172031	16384	83	Linux
/dev/mmcblk1p7		172032	1744895	786432	83	Linux

/dev/mmcblk1p8	1744896	1777663	16384	83	Linux
/dev/mmcblk1p9	1777664	1843199	32768	83	Linux
/dev/mmcblk1p10	1843200	3416063	786432	83	Linux
/dev/mmcblk1p11	3416064	3448831	16384	83	Linux
/dev/mmcblk1p12	3448832	3481599	16384	83	Linux
/dev/mmcblk1p13	3481600	3514367	16384	83	Linux
/dev/mmcblk1p14	3514368	3579903	32768	83	Linux
/dev/mmcblk1p15	3579904	3612671	16384	83	Linux
/dev/mmcblk1p16	3612672	4923391	655360	83	Linux

Partition table entries are not in disk order

Disk /dev/mmcblk1boot1: 4 MB, 4194304 bytes
 4 heads, 16 sectors/track, 128 cylinders, total 8192 sectors
 Units = sectors of 1 * 512 = 512 bytes
 Sector size (logical/physical): 512 bytes / 512 bytes
 I/O size (minimum/optimal): 512 bytes / 512 bytes
 Disk identifier: 0x00000000

Disk /dev/mmcblk1boot1 doesn't contain a valid partition table

Disk /dev/mmcblk1boot0: 4 MB, 4194304 bytes
 4 heads, 16 sectors/track, 128 cylinders, total 8192 sectors
 Units = sectors of 1 * 512 = 512 bytes
 Sector size (logical/physical): 512 bytes / 512 bytes
 I/O size (minimum/optimal): 512 bytes / 512 bytes
 Disk identifier: 0x00000000

Disk /dev/mmcblk1boot0 doesn't contain a valid partition table

Unmount all that and copy the Ubuntu Vivid image I made over to the running OPI.

```
root@orangepi:/root# scp bv@hal:/home/bv/projects/orange-pi/make_linux/linux-vivid.img
root@orangepi:/root# dd bs=4M if=linux-vivid.img.img of=/dev/mmcblk1 ; sync
root@orangepi:~/burn-image-to-emmc# dd if=u-boot-sun8iw7p1.bin of=/dev/mmcblk1 bs=1024
```

The .bin is in /home/orangepi/burn-image-to-emmc/u-boot-sun8iw7p1.bin.

```
root@orangepi:~# fdisk -l /dev/mmcblk1
```

```

Disk /dev/mmcblk1: 7838 MB, 7838105600 bytes
4 heads, 16 sectors/track, 239200 cylinders, total 15308800 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x062475c6

```

Device	Boot	Start	End	Blocks	Id	System
/dev/mmcblk1p1		40960	122879	40960	b	W95 FAT32
/dev/mmcblk1p2		122880	1556480	716800+	83	Linux

Reboot with SD card removed. Success! Do `fs_resize` and reboot again.

```

root@lpc:~# ./install_mate_desktop
...
usermod: user 'orangepi' does not exist
chown: invalid user: 'orangepi:orangepi'
...
*****
* MATE DESKTOP INSTALLED, please REBOOT now! *
*****
root@lpc:~# reboot

```

MATE, but it is 720p.
Steven says

Third you copy `script.bin` to your MicroSD card boot partition `/dev/sdb1` or `/dev/mmcblk1`

This is referring to what comes on the first partition of the Lubuntu 0.9.0 image.

```

root@lpc:~# mount /dev/mmcblk0p1 /mnt
root@lpc:~# ls -la /mnt/
total 7847
drwxr-xr-x  2 lpc  lpc      512 Dec 31  1969 .
drwxr-xr-x 20 root root    4096 Jul 18 17:29 ..
-rw-r--r--  1 lpc  lpc  8029912 Jul 18  2015 uImage
root@lpc:~# scp bv@hal:/media/bv/F875-EAED/script.bin /mnt/
root@lpc:~# reboot

```

Still looks 720p. Try `update_boot.sh`

```
root@lpc:~# ./update_boot.sh
```

```
Sat Jul 18 18:07:51 EDT 2015
```

```
*****
```

```
Updating boot0 & u-boot for OrangePI
```

```
*****
```

```
Do you want to download boot&kernel package from server, (y/N)? y.
```

```
Downloading the package ...
```

```
--2015-07-18 18:07:53-- http://loboris.eu/boot_kernel.tar.gz
```

```
Resolving loboris.eu (loboris.eu)... 82.196.4.208
```

```
Connecting to loboris.eu (loboris.eu)|82.196.4.208|:80... connected.
```

```
HTTP request sent, awaiting response... 200 OK
```

```
Length: 16788502 (16M) [application/x-gzip]
```

```
Saving to: '/tmp/boot_kernel/boot_kernel.tar.gz'
```

```
/tmp/boot_kernel/boot_kernel. 100%[=====>]
```

```
2015-07-18 18:07:57 (5.24 MB/s) - '/tmp/boot_kernel/boot_kernel.tar.gz' saved [16788502]
```

```
Unpacking ...
```

```
'./boot0_sdcard_OPI-2.fex' -> '/boot/boot0_sdcard_OPI-2.fex'
```

```
'./boot0_sdcard_OPI-PLUS.fex' -> '/boot/boot0_sdcard_OPI-PLUS.fex'
```

```
'./u-boot_OPI-2.fex' -> '/boot/u-boot_OPI-2.fex'
```

```
'./u-boot_OPI-PLUS.fex' -> '/boot/u-boot_OPI-PLUS.fex'
```

```
'./uImage_OPI-2' -> '/boot/uImage_OPI-2'
```

```
'./uImage_OPI-PLUS' -> '/boot/uImage_OPI-PLUS'
```

```
Files unpacked to /boot
```

```
=====
```

```
=====
```

```
Select the OrangePI board you want to upgrade:
```

```
1 OrangePI 2
```

```
2 OrangePI PLUS
```

```
? 2.
```

```
Updating OrangePI PLUS
```

```
WARNING: boot0 & u-boot on /dev/mmcblk0 WILL BE REPLACED, Continue (y/N)? y
```

```
Writing boot files to /dev/mmcblk0 ...
32+0 records in
32+0 records out
32768 bytes (33 kB) copied, 0.00152654 s, 21.5 MB/s
880+0 records in
880+0 records out
901120 bytes (901 kB) copied, 0.138017 s, 6.5 MB/s
```

```
Boot files updated, please REBOOT.
=====
```

```
Do you want to write the new kernel (uImage) to fat partition (y/N)? y
./update_boot.sh: line 116: [: /media/lpc/B00T: binary operator expected
cp: target '/mnt/uImage' is not a directory
```

```
uImage updated, please REBOOT.
=====
```

```
root@lpc:~# reboot
```

Survey says... Errr... Black screen. No ping. Red led.
Oh, wait, there was a script failure. Dammit.
Reboot Lubuntu.

```
root@orangepi:/root# dd bs=4M if=linux-vivid.img.img of=/dev/mmcblk1 ; sync
root@orangepi:~/burn-image-to-emmc# dd if=u-boot-sun8iw7p1.bin of=/dev/mmcblk1 bs=1024
```

This time read lboris more carefully:

All images are prepared for 1920x108p resolution. To easily change resolution please download scripts_{bin}.zip from Mega, unpack and copy the file which matches your board and resolution to SD Card FAT partition (where the uImage is). Rename it to script.bin

```
root@lpc:~# mount /dev/mmcblk0p1 /mnt
root@lpc:~# ls -la /mnt
total 7847
drwxr-xr-x  2 root root    512 Dec 31  1969 .
drwxr-xr-x 20 root root   4096 Jul 18 18:24 ..
-rwxr-xr-x  1 root root 8029912 Jul 18  2015 uImage
```

```

root@lpc:~# scp bv@hal:/home/bv/projects/orange-pi/script.bin.OPI-PLUS /mnt/script.bin
root@lpc:~# md5sum /mnt/*
df8ec789eb1df1f6dba0f8f337f7d547 /mnt/script.bin
9489dd3a1a498b529948f4eb62210663 /mnt/uImage
root@lpc:~# umount /mnt
root@lpc:~# reboot

```

Seems to hang after:

```
disp_device_attached_and_enable,line:159:attched ok, mgr0<-->device0, type=4, mode=10
```

Note, attched is sic. No network. I plug/unplug USB and get notice on the console.

Plugging in microSD card, and the boot continues! And into 1080p. WTF?

```

root@orange:~# mount /dev/mmcblk0p1 /mnt/tmp/
root@orange:~# ls -la /mnt/tmp/
total 4982
drwx----- 3 orange orange 16384 Jan 1 1970 .
drwxr-xr-x 19 root root 4096 Jul 19 05:20 ..
-rw-r--r-- 1 orange orange 37468 Jun 21 22:30 script.bin
drwx----- 4 orange orange 2048 Jun 21 23:03 .Trash-1001
-rw-r--r-- 1 orange orange 5039512 Jun 21 19:59 uImage
root@orange:~# md5sum /mnt/tmp/*
849026298671c6bdb237772a005898a /mnt/tmp/script.bin
d54037796857553115e3a2ba0ab828be /mnt/tmp/uImage

```

Reboot with uSD card in to see eMMC. Now, have 720p.

I think what's happening is that the `script.bin` from loboris is configured to use. Remove `script.bin`.

```

root@orange:~# mount /dev/mmcblk1p1 /mnt/
root@orange:~# rm /mnt/tmp/script.bin

```

Back in loboris's, redo:

```
root@lpc:~# ./update_boot.sh
```

```
Sat Jul 18 18:52:35 EDT 2015
```

```
*****
```

Updating boot0 & u-boot for OrangePI

Do you want to download boot&kernel package from server, (y/N)? y.

Downloading the package ...

--2015-07-18 18:52:38-- http://loboris.eu/boot_kernel.tar.gz

Resolving loboris.eu (loboris.eu)... 82.196.4.208

Connecting to loboris.eu (loboris.eu)|82.196.4.208|:80... connected.

HTTP request sent, awaiting response... 200 OK

Length: 16788502 (16M) [application/x-gzip]

Saving to: '/tmp/boot_kernel/boot_kernel.tar.gz'

/tmp/boot_kernel/boot_kernel. 100%[=====>]

2015-07-18 18:52:42 (5.19 MB/s) - '/tmp/boot_kernel/boot_kernel.tar.gz' saved [16788502]

Unpacking ...

'./boot0_sdcard_OPI-2.fex' -> '/boot/boot0_sdcard_OPI-2.fex'

'./boot0_sdcard_OPI-PLUS.fex' -> '/boot/boot0_sdcard_OPI-PLUS.fex'

'./u-boot_OPI-2.fex' -> '/boot/u-boot_OPI-2.fex'

'./u-boot_OPI-PLUS.fex' -> '/boot/u-boot_OPI-PLUS.fex'

'./uImage_OPI-2' -> '/boot/uImage_OPI-2'

'./uImage_OPI-PLUS' -> '/boot/uImage_OPI-PLUS'

Files unpacked to /boot

=====

=====

Select the OrangePI board you want to upgrade:

1 OrangePI 2

2 OrangePI PLUS

? 2.

Updating OrangePI PLUS

WARNING: boot0 & u-boot on /dev/mmcblk0 WILL BE REPLACED, Continue (y/N)? y

Writing boot files to /dev/mmcblk0 ...

32+0 records in

32+0 records out

32768 bytes (33 kB) copied, 0.00311417 s, 10.5 MB/s

```
880+0 records in
880+0 records out
901120 bytes (901 kB) copied, 0.118625 s, 7.6 MB/s
```

```
Boot files updated, please REBOOT.
=====
```

```
Do you want to write the new kernel (uImage) to fat partition (y/N)? y
```

```
uImage updated, please REBOOT.
=====
```

```
root@lpc:~# reboot
```

No error this time. . . . Just black screen, Red LED power, screen lit, not ping, no keyboard light up.

One more time in Stevens.

```
root@orange:~# dd bs=4M if=/root/linux-vivid.img of=/dev/mmcblk1 ; sync
root@orange:~# dd if=/home/orange/burn-image-to-emmc/u-boot-sun8iw7p1.bin of=/
root@orange:~# mount /dev/mmcblk1p1 /mnt
root@orange:~# mkdir /mnt/emmc-boot /mnt/sdcard-boot
root@orange:~# mount /dev/mmcblk1p1 /mnt/emmc-boot
root@orange:~# mount /dev/mmcblk0p1 /mnt/sdcard-boot
root@orange:~# ls -l /mnt/emmc-boot/ /mnt/sdcard-boot/
/mnt/emmc-boot/:
total 7842
-rwxr-xr-x 1 root root 8029912 Jul 18 19:23 uImage

/mnt/sdcard-boot/:
total 4960
-rwxr-xr-x 1 root root      0 Jul 19 06:59 FS.sd-boot
-rwxr-xr-x 1 root root 37468 Jun 21 22:30 script.bin
-rwxr-xr-x 1 root root 5039512 Jun 21 19:59 uImage

root@orange:~# cp /mnt/sdcard-boot/script.bin /mnt/emmc-boot/
root@orange:~# reboot
```

Boots. Do `fs_resize`, reboot. install mate desktop. Again, now `mmcblk0` is eMMC. I guess the number is dynamically chosen. Here are the `md5sum` of the booted kernel and script:

```

root@lpc:~# md5sum /mnt/*
849026298671c6bdb237772a005898a  /mnt/script.bin
9489dd3a1a498b529948f4eb62210663  /mnt/uImage

```

Arg, after installing MATE boots to lightdm but it's still 720p. Next I can try writing Steven's uboot+script.

4 Understanding u-boot/sunxi

- fex file
- OPP page

Woot! 1080p. Copy script.bin from boot partition and:

```

root@lpc:~# cp /mnt/emmc-boot/script.bin .
root@lpc:~# bin2fex script.bin script.fex
fexc-bin: script.bin: version: 37468.1.2
fexc-bin: script.bin: size: 37468 (79 sections)
root@lpc:~# cp script.fex script-1080p.fex
root@lpc:~# emacs -nw script-1080p.fex
root@lpc:~# diff script.fex script-1080p.fex
329c329
< screen0_output_mode = 5
---
> screen0_output_mode = 10
351c351
< :      If set gamc_phy to use = 1
---
> ;:      If set gamc_phy to use = 1
root@lpc:~# fex2bin script-1080p.fex script-1080p.bin
root@lpc:~# cp script-1080p.bin /mnt/emmc-boot/script.bin
root@lpc:~# reboot

```