GadgetPC
Single Board Computer

JFFS2 on DataFlash

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1. Overview

Thank you for your purchase of the GadgetPC Single Board Computer.
GadgetPC is a powerful computer board that is capable of running high-level operating systems such as Linux.

This document is for advanced users who want to use JFFS2 file system on a DataFlash AT45DB642 chip that is installed to the board by default.
U-boot log shows the memory map of this chip.

DataFlash:AT45DB642
Nb pages: 8192
Page Size: 1056
Size= 8650752 bytes
Logical address: 0xD0000000
Area 0: D0000000 to D0003FFF (RO) Bootstrap
Area 1: D0004000 to D0007FFF Environment
Area 2: D0008000 to D002FFFF (RO) U-Boot
Area 3: D0030000 to D042FFFF Kernel
Area 4: D0430000 to D083FFFF FS

The chip AT45DB642 provides 8192 pages. Page size is 1056 bytes. Total capacity is 8192 * 1056 = 8650752 bytes.
Area 4 is reserved for a file system.

The disk partition will start from 4159th page.
Disk Offset = 4159 * 1056 = 0x4303E0
Disk Size = 0x840000 - 0x4303E0 = 0x40FC20 = 4258848 bytes

2. Linux kernel.
It has to be compiled with the following settings

```
# grep  "MTD" .config | grep -v "is not set"
CONFIG_MTD=y
CONFIG_MTD_PARTITIONS=y
CONFIG_MTD_CMDLINE_PARTS=y
CONFIG_MTD_CHAR=y
CONFIG_MTD_BLKDEVS=y
CONFIG_MTD_BLOCK=y
CONFIG_MTD_MAP_BANK_WIDTH_1=y
CONFIG_MTD_MAP_BANK_WIDTH_2=y
CONFIG_MTD_MAP_BANK_WIDTH_4=y
CONFIG_MTD_CFI_I1=y
CONFIG_MTD_CFI_I2=y
# Self-contained MTD device drivers
CONFIG_MTD_DATAFLASH=y
CONFIG_MTD_DATAFLASH_WRITE_VERIFY=y

# grep  "JFFS2" .config | grep -v "is not set"
CONFIG_JFFS2_FS=y
CONFIG_JFFS2_FS_DEBUG=0
CONFIG_JFFS2_FS_WRITEBUFFER=y
CONFIG_JFFS2_ZLIB=y
CONFIG_JFFS2_RTIME=y
```

2.1. Download the newest precompiled Linux kernel (**linux2.60.30.4_4sep2009.tar.bz2**) from FTP server
host=www.bipom.com
port=21
user=bipomftp
pass=guest123!

2.2. Use the following commant to extract files from archive
tar –xvjf linux2.6.30.4_4sep2009.tar.bz2

2.3. Create a dual partition USB flash drive

To obtain extra details please read **GadgetPC Debian Installation Guide** document
from http://www.bipom.com/web_documents/2899678.html

2.4. Copy all the files/folders from **linux2.6.30.4_4sep2009** folder **to /media/FAT**
cp -R linux2.6.30.4_4sep2009/* /media/FAT

2.5. Linux Kernel command line has to be
mem=32M console=ttyS1,115200 root=/dev/sda2 rw rootwait mtdparts=spi0.1-AT45DB642x:0x40FC20@0x4303E0(df)

Use the following U-boot commands to change the command line
setenv bootargs 'mem=32M console=ttyS1,115200 root=/dev/sda2 rw rootwait mtdparts=spi0.1-AT45DB642x:0x40FC20@0x4303E0(df)'
saveenv

2.6. Linux Kernel log shoud show

```
atmel_spi atmel_spi.0: Atmel SPI Controller at 0xfffc8000 (irq 12)
mtd_dataflash spi0.1: AT45DB642x (8448 KBytes) pagesize 1056 bytes (OTP)
1 cmdlinepart partitions found on MTD device spi0.1-AT45DB642x
Creating 1 MTD partitions on "spi0.1-AT45DB642x":
```

Check if all the devices are present in the system

```
debian-armel:~# ls -l /dev | grep mtd
crw-rw---- 1 root root     90,   0 2009-09-04 13:09 mtd0
crw-rw---- 1 root root     90,   1 2009-09-04 13:09 mtd0ro
brw-rw---- 1 root disk     31,   0 2009-09-04 13:09 mtdblock0
```

3. JFFS2 file system.

3.1. Create any folder with a test file
debian-armel:~# echo "GadgetPC" > /tmp/gpc

3.2. Install MTD tools
debian-armel:~# apt-get install mtd-tools

3.3. Create a disk image
debian-armel:~# mkfs.jffs2 -d /tmp -l -p -e 0x2100 -v -n -o /root/img.jffs2

3.4. Copy a disk image to the device
debian-armel:/# cp /root/img.jffs2 /dev/mtd0

3.5. Mount the new drive and check
debian-armel:/# mkdir /mnt/df
debian-armel:/# mount -t jffs2 /dev/mtdblock0 /mnt/df
debian-armel:/mnt# df -h
Filesystem Size Used Avail Use% Mounted on
/dev/sda1 1.9G 896M 874M 51% /
tmpfs 31M 0 31M 0% /lib/init/rw
udev 10M 32K 10M 1% /dev
tmpfs 31M 0 31M 0% /dev/shm
/dev/mtdblock0 4.1M 160K 4.0M 4% /mnt/df
debian-armel:/mnt# ls -l /mnt/df
total 1
-rw-r--r-- 1 user user 9 2009-09-04 11:21 gpc
debian-armel:/mnt# cat /mnt/df/gpc
GadgetPC

3.6. Unmount the new drive
debian-armel:/# umount /mnt/df