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【原创】如何将kernel/rootfs/u-boot/dtb文件烧写到flash

(2010-12-22 17:28:49)

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标签：

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【本文全文以Freescale Powerpc 8315serdb开发板为例】

以下为烧写kernel 和文件系统到flash的步骤，以下代码在uboot中执行。
并且，在执行前，请先更改自己板子的mac地址。

```
erase fe100000 ffffffff
setenv serverip 192.168.0.73
```

```
tftp 2000000 uImage
```

```
cp.b 2000000 ffd00000 $filesize
```

```
tftp 600000 mpc8315erdb.dtb
cp.b 600000 fff80000 $filesize
```

```
tftp 2000000 rootfs.jffs2
cp.b 2000000 fe100000 $filesize
```

```
setenv bootcmd "setenv bootargs root=/dev/mtdblock1 rw rootfstype=jffs2 console=ttyS0,115200;bootm ffd00000 - fff80000"
```

```
saveenv
reset
```

####详细的亲自实践部分：

将开发板与PC机的串口互连，打开PC机的串口工具，重启开发板：
U-Boot 1.3.0-rc2 (May 6 2010 - 09:45:53) MPC83XX

Reset Status: Software Hard, External/Internal Soft, External/Internal Hard

CPU: e300c3, MPC8315E, Rev: 1.1 at 400 MHz, CSB: 133 MHz

Board: Freescale MPC8315ERDB Rev 1.0

I2C: ready

DRAM: 128 MB

PCIE0: No link

PCIE1: No link

FLASH: 8 MB

In: serial

Out: serial

Err: serial

Net: eTSEC0, eTSEC1

Hit any key to stop autoboot: 0

=>

=> binfo

memstart = 0x00000000

memsize = 0x10000000

flashstart = 0xFE000000

flashsize = 0x02000000

flashoffset = 0x0008E000

sramstart = 0x00000000

sramsize = 0x00000000

bootflags = 0x00000001

intfreq = 399.999 MHz

busfreq = 133.333 MHz

ethaddr = 24:1F:2C:00:01:77

ethladdr = 24:1F:2C:02:01:77

IP addr = 192.168.0.234

baudrate = 115200 bps

=>

=> mm fe000000

fe000000: 42424242 ?

fe000004: 42424242 ?

fe000008: 06060606 ?

.....

fe000140: 38a4014c ?

fe000144: 7ca803a6 ?

fe000148: 4e800020 ? q

=> mm ff000000

ff000000:Machine check in kernel mode.

Caused by (from msr): regs 07f39cc0 Unknown values in msr

NIP: 07FD3330 XER: 20000000 LR: 07FD3300 REGS: 07f39cc0 TRAP: 0200 DAR: 00000000

MSR: 00001000 EE: 0 PR: 0 FP: 0 ME: 1 IR/DR: 00

GPR00: 07FD3300 07F39DB0 00000080 07FEDD34 07FEDD34 00000010 00000001 00000030

GPR08: 00000001 00000020 00000008 FFFFFFFF 00000000 EFBFBF7F 07FFA000 09FBC000

GPR16: 00000000 00000000 00000000 00000000 00000000 FFFFFFFF 00000000 00000000

GPR24: 07F3C2C8 00000000 00000001 00000004 07F3C378 07F39F4C 07FFAD7C FF000000

Call backtrace:

07FD3300 07FDBB28 07FDB1BC 07FDB344 07FCB838 07FC0BEC 07FBF68C

machine check

Resetting the board.

再次重启开发板：

U-Boot 1.3.0-rc2 (May 6 2010 - 09:45:53) MPC83XX

Reset Status: Software Hard, External/Internal Soft, External/Internal Hard

CPU: e300c3, MPC8315E, Rev: 11 at 400 MHz, CSB: 133 MHz

Board: Freescale MPC8315ERDB Rev 1.0

I2C: ready

DRAM: 128 MB

PCIE0: No link

PCIE1: No link

FLASH: 8 MB

In: serial

Out: serial

Err: serial

Net: eTSEC0, eTSEC1

Hit any key to stop autoboot: 0

=>

=>

=>

=> print

ramboot=setenv bootargs root=/dev/ram rw console=\$consoledev,\$baudrate \$othbootargs;tftp \$ramdiskaddr \$ramdiskfile;tftp \$loadaddr \$bootfile;tftp \$fdtaddr

\$fdtfile;bootm \$loadaddr \$ramdiskaddr \$fdtaddr

nfsboot=setenv bootargs root=/dev/nfs rw nfsroot=\$serverip:\$rootpath ip=\$ipaddr:\$serverip:\$gatewayip:\$netmask:\$hostname:\$netdev:off

console=\$consoledev,\$baudrate \$othbootargs;tftp \$loadaddr \$bootfile;tftp \$fdtaddr \$fdtfile;bootm \$loadaddr - \$fdtaddr

bootdelay=6

baudrate=115200

loads_echo=1

eth1addr=04:00:00:00:00:0B

netdev=eth0

consoledev=ttyS0

ramdiskaddr=1000000

ramdiskfile=ramfs.83xx

fdtaddr=400000

fdtfile=mpc8315erdb.dtb

pciconfighost=yes

ethact=eTSEC0

bootcmd=bootm fe500000 fe100000 fe700000

ethaddr=04:00:00:09:09:09

filesize=4294E1

fileaddr=2000000

ipaddr=192.168.0.199

bootargs=root=/dev/ram rw console=ttyS0,115200 ramdisk_size=65535

loadaddr=2000000

mtddids=nor0=nor,nand0=nand

serverip=192.168.0.165

stdin=serial

stdout=serial

stderr=serial

Environment size: 957/8188 bytes

=> setenv serverip 192.168.0.73 ###假设tftp服务器IP地址192.168.0.73

=> tftp \$loadaddr u-boot.bin ###远程下载到板子的内存中

eTSEC0: No link.

Speed: 1000, full duplex

Using eTSEC1 device

TFTP from server 192.168.0.73; our IP address is 192.168.0.199

Filename 'u-boot.bin'.

Load address: 0x2000000

Loading: #####

done

Bytes transferred = 316996 (4d644 hex)

=> protect off all ###使得flash可写入

Un-Protect Flash Bank # 1

=> erase fe000000 fe0ffff ###擦除原始flash 数据

..... done

Erased 16 sectors

=> cp.b \$loadaddr fe000000 \$filesize ###从内存写到flash中

Copy to Flash... done

=> reset ###重启开发板

Resetting the board.

####重启开发板以后：可以使用ramdisk方式从远程tftp获取这三个文件：

uImage;rootfs.ext2.gz.uboot; mpc8315erdb.dtb

U-Boot 2009.03-rc2 (Oct 19 2009 - 11:14:32) MPC83XX

Reset Status: Software Hard, External/Internal Soft, External/Internal Hard

```
CPU: e300c3, MPC8315E, Rev: 1.1 at 400 MHz, CSB: 133.333 MHz
Board: Freescale MPC8315ERDB Rev 1.0
I2C: ready
DRAM: 128 MB
FLASH: 8 MB
NAND: 32 MiB
*** Warning - bad CRC, using default environment
```

```
PCIE0: No link
PCIE1: No link
In: serial
Out: serial
Err: serial
Net: eTSEC0, eTSEC1
Hit any key to stop autoboot: 0
=>
=>
=> help
? - alias for 'help'
autoscr - run script from memory
base - print or set address offset
bdinfo - print Board Info structure
boot - boot default, i.e., run 'bootcmd'
bootd - boot default, i.e., run 'bootcmd'
bootm - boot application image from memory
bootp - boot image via network using BOOTP/TFTP protocol
chpart - change active partition
clocks - print clock configuration
cmp - memory compare
coninfo - print console devices and information
cp - memory copy
crc32 - checksum calculation
date - get/set/reset date & time
echo - echo args to console
erase - erase FLASH memory
exit - exit script
ext2load- load binary file from a Ext2 filesystem
ext2ls - list files in a directory (default /)
fdt - flattened device tree utility commands
flinfo - print FLASH memory information
fsinfo - print information about filesystems
fsload - load binary file from a filesystem image
go - start application at address 'addr'
help - print online help
icrc32 - checksum calculation
iloop - infinite loop on address range
imd - i2c memory display
iminfo - print header information for application image
imls - list all images found in flash
imm - i2c memory modify (auto-incrementing)
imw - memory write (fill)
imxtract- extract a part of a multi-image
inm - memory modify (constant address)
iprobe - probe to discover valid I2C chip addresses
itest - return true/false on integer compare
loadb - load binary file over serial line (kermit mode)
loads - load S-Record file over serial line
loady - load binary file over serial line (ymodem mode)
loop - infinite loop on address range
ls - list files in a directory (default /)
md - memory display
mii - MII utility commands
mm - memory modify (auto-incrementing)
mtdparts- define flash/nand partitions
mtest - simple RAM test
mw - memory write (fill)
nand - NAND sub-system
nboot - boot from NAND device
nfs - boot image via network using NFS protocol
nm - memory modify (constant address)
pci - list and access PCI Configuration Space
ping - send ICMP ECHO_REQUEST to network host
printenv- print environment variables
protect - enable or disable FLASH write protection
rarpboot- boot image via network using RARP/TFTP protocol
reset - Perform RESET of the CPU
run - run commands in an environment variable
sata - SATA sub system
saveenv - save environment variables to persistent storage
setenv - set environment variables
showvar - print local hushshell variables
sleep - delay execution for some time
test - minimal test like /bin/sh
tftpboot- boot image via network using TFTP protocol
version - print monitor version
=>
```

```
=> setenv serverip 192.168.0.73
```

```
=> ping 192.168.0.73
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
=>
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
=>
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
=>
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.10 is not alive
=> ping 192.168.0.10
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.10 is not alive
=> print
bootcmd=setenv bootargs root=/dev/nfs rw nfsroot=$serverip:$rootpath ip=$ipaddr:$serverip:$gatewayip:$netmask:$hostname:$netdev:off
console=$consoledev,$baudrate $othbootargs;tftp $loadaddr $bootfile;tftp $fdtaddr $fdtfile;bootm $loadaddr - $fdtaddr
ramboot=setenv bootargs root=/dev/ram rw console=$consoledev,$baudrate $othbootargs;tftp $ramdiskaddr $ramdiskfile;tftp $loadaddr $bootfile;tftp $fdtaddr
$fdtfile;bootm $loadaddr $ramdiskaddr $fdtaddr
nfsboot=setenv bootargs root=/dev/nfs rw nfsroot=$serverip:$rootpath ip=$ipaddr:$serverip:$gatewayip:$netmask:$hostname:$netdev:off
console=$consoledev,$baudrate $othbootargs;tftp $loadaddr $bootfile;tftp $fdtaddr $fdtfile;bootm $loadaddr - $fdtaddr
bootdelay=6
baudrate=115200
loads echo=1
ethaddr=04:00:00:00:00:0A
eth1addr=04:00:00:00:00:0B
loadaddr=500000
netdev=eth0
consoledev=ttyS0
ramdiskaddr=1000000
ramdiskfile=ramfs.83xx
fdtaddr=400000
fdtfile=mpc8315erdb.dtb
stdin=serial
stdout=serial
stderr=serial
bootargs=root=/dev/ram rw console=ttyS0,115200 ramdisk_size=65535
ethact=eTSEC1
serverip=192.168.0.73
```

```
Environment size: 1065/8188 bytes
=>
```

###可以看到：烧写了新的uboot，需要修改部分env变量

```
=> setenv ethaddr 04:00:00:09:09:09
```

```
=> setenv ethact eTSEC0
=> saveenv
```

```
=> ping 192.168.0.73
Waiting for PHY realtime link..... TIMEOUT !
done
eTSEC0: No link.
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
=>
```

发现网口擦错了，两个网口TSEC1/TSEC2.将网线重新擦到TSEC1。重启reset

.....

```
=>
```

```
=> ping 192.168.0.73
Waiting for PHY realtime link..... TIMEOUT !
done
eTSEC0: No link.
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
```

```
=> ping 192.168.0.73
Speed: 1000, full duplex
*** ERROR: 'ipaddr' not set
ping failed; host 192.168.0.73 is not alive
=> setenv ipaddr 192.168.0.199 ###还需要设置板子的IP地址
=> saveenv
Saving Environment to Flash...
```

```
.done
Un-Protected 1 sectors
Erasing Flash...
.done
Erased 1 sectors
Writing to Flash... done
.done
Protected 1 sectors
=> ping 192.168.0.73
Speed: 1000, full duplex
Using eTSEC0 device
host 192.168.0.73 is alive
=>
```

【板子ramdisk启动方法】

```
=> setenv serverip 192.168.0.73

=> setenv bootargs root=/dev/ram rw console=ttyS0,115200 ramdisk_size=65535
=> tftp 1000000 uImage;tftp 2000000 rootfs.ext2.gz.uboot;tftp 6000000 mpc8315erdb.dtb;bootm 1000000 2000000 6000000
Speed: 1000, full duplex
Using eTSEC0 device
TFTP from server 192.168.0.73; our IP address is 192.168.0.199
Filename 'uImage'.
Load address: 0x1000000
Loading: #####
#####
#####
done
Bytes transferred = 1970252 (1e104c hex)
Speed: 1000, full duplex
Using eTSEC0 device
TFTP from server 192.168.0.73; our IP address is 192.168.0.199
Filename 'rootfs.ext2.gz.uboot'.
Load address: 0x2000000
Loading: #####
#####
#####
#####
done
Bytes transferred = 4372778 (42b92a hex)
Speed: 1000, full duplex
Using eTSEC0 device
TFTP from server 192.168.0.73; our IP address is 192.168.0.199
Filename 'mpc8315erdb.dtb'.
Load address: 0x6000000
Loading: #
done
Bytes transferred = 9953 (26e1 hex)
## Booting kernel from Legacy Image at 01000000 ...
   Image Name:   Linux-2.6.29.6-rt23
   Created:      2009-10-19   3:17:30 UTC
   Image Type:   PowerPC Linux Kernel Image (gzip compressed)
   Data Size:    1970188 Bytes = 1.9 MB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK
## Loading init Ramdisk from Legacy Image at 02000000 ...
   Image Name:   uboot ext2 ramdisk rootfs
   Created:      2009-10-19   3:20:24 UTC
   Image Type:   PowerPC Linux RAMDisk Image (gzip compressed)
   Data Size:    4372714 Bytes = 4.2 MB
   Load Address: 00000000
   Entry Point:  00000000
   Verifying Checksum ... OK
## Flattened Device Tree blob at 00600000
   Booting using the fdt blob at 0x600000
   Uncompressing Kernel Image ... OK
   Loading Ramdisk to 07afb000, end 07f268ea ... OK
Using MPC831x RDB machine description
Linux version 2.6.29.6-rt23 (liyw@rock) (gcc version 4.1.2) #1 Mon Oct 19 11:17:28 CST 2009
Found initrd at 0xc7afb000:0xc7f268ea
console [udbg0] enabled
setup_arch: bootmem
mpc831x_rdb_setup_arch()
Found FSL PCI host bridge at 0x00000000e0008500. Firmware bus number: 0->0
PCI host bridge /pci@e0008500 (primary) ranges:
MEM 0x0000000090000000..0x000000009fffffff -> 0x0000000090000000
MEM 0x0000000080000000..0x000000008fffffff -> 0x0000000080000000 Prefetch
IO 0x00000000e0300000..0x00000000e03ffffff -> 0x0000000000000000
Found FSL PCI host bridge at 0x00000000e0009000. Firmware bus number: 0->0
PCI host bridge /pci@e0009000 ranges:
MEM 0x00000000a0000000..0x00000000affffffff -> 0x00000000a0000000
IO 0x00000000b1000000..0x00000000b17ffffff -> 0x0000000000000000
Found FSL PCI host bridge at 0x00000000e000a000. Firmware bus number: 0->0
PCI host bridge /pci@e000a000 ranges:
MEM 0x00000000c0000000..0x00000000cfffffff -> 0x00000000c0000000
```

```
IO 0x00000000d1000000..0x00000000d17ffff -> 0x0000000000000000
arch: exit
Zone PFN ranges:
DMA    0x00000000 -> 0x00008000
Normal 0x00008000 -> 0x00008000
```

.....

```
Setting the hostname to mpc8315erdb
Mounting filesystems
Running sysctl
Setting up networking on loopback device:
Setting up networking on eth0:
Setting up networking on eth1:
Starting inetd:
```

Welcome to the LTIB Embedded Linux Environment

!!!! WARNING !!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

mpc8315erdb login: PHY: mdio@24520:00 - Link is Up - 1000/Full

Welcome to the LTIB Embedded Linux Environment

!!!! WARNING !!!!!

The default password for the root account is: root
please change this password using the 'passwd' command
and then edit this message (/etc/issue) to remove this message

```
mpc8315erdb login: root
Password:
login[1747]: root login on 'ttyS0'
```

####敲回车

```
[root@mpc8315erdb /root]#
[root@mpc8315erdb /root]#
[root@mpc8315erdb /root]#
```

自动重启成功，通过ramdisk启动，已经进入linux系统。

可以继续后面的开发工作。

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