

2.5 Operate the Development Board Terminal through the Serial Port

Description: look forward to learning each of the embedded Linux fans should learn to use the terminal console skilled operation, Linux commands for all platforms are similar, and more than 99% of orders are the same; when you can refer to the command-line swift delivery when you have been deeply in love with Linux.

The operation of this section before you in accordance with section 2.1.3 HyperTerminal is set up correctly.

The chart below shows through the serial port of the Linux Terminal login interface may be associated with this practice is not exactly the same, but the basic are similarly, under the prompt, press Enter, you can start the journey Linux console.

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
lib80211: common routines for IEEE802.11 drivers
s3c2410-rtc s3c2410-rtc: setting system clock to 2005-06-19 19:17:12 UTC (1119208632)
FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will be case sensitive!
yaffs: dev is 32505858 name is "mtdblock2"
yaffs: passed flags ""
yaffs: Attempting MTD mount on 31.2, "mtdblock2"
yaffs: block 616 is marked bad
block 617 is bad
yaffs_read_super: isCheckpointed 0
VFS: Mounted root (yaffs filesystem) on device 31:2.
Freeing init memory: 128K
[19/Jun/2005:11:17:19 +0000] boa: server version Boa/0.94.13
[19/Jun/2005:11:17:19 +0000] boa: server built Mar 26 2009 at 15:28:42.
[19/Jun/2005:11:17:19 +0000] boa: starting server pid=498, port 80

Try to bring eth0 interface up.....eth0: link down
Done

Please press Enter to activate this console.
[root@FriendlyARM /]# _
    
```

Connected 1:33:58 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

2.5.1 MP3 Player

Test Name: madplay		Remarks
Source Code Package Name	madplay.tgz	
Location on the CD-ROM	Linux\madplay.tgz	
Cross compiler	Arm-linux-gcc-4.3.2 with EABI	
Others:		

We transplanted madplay under a console-based mp3 player. It has a variety of playback control mode, the most simple to use is:

```
#madplay your.mp3
```

The order will be the default mode of play your.mp3 documents (development board your.mp3 there is no document, just for example here below).

Note: The system will automatically start playing after the "/" directory shanghai.mp3 document.

Can run "madplay -h" to view the use of help.

2.5.2 How to stop process

To suspend the operation of the procedure, you can at the same time in a terminal console by pressing Ctrl + c, Note: press Ctrl, do not let open, and then press the c button.

For example: We have just ordered the use of madplay broadcast mp3, if you want to suspend the operation of this procedure, you can press Ctrl + c key under.

In addition, if the program is run in the background, you can use the kill command to kill the process

2.5.3 USB/Mobile Hard Disk

Insert the USB, the system will automatically create a /udisk directory, and automatically mount USB to the above, at this time in the series I would like the following information:

```

ttySO - HyperTerminal
File Edit View Call Transfer Help
Please press Enter to activate this console.
[root@FriendlyARM /]# usb 1-1: new full speed USB device using s3c2410-ohci and
address 2
usb 1-1: New USB device found, idVendor=0781, idProduct=5408
usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
usb 1-1: Product: U3 Titanium
usb 1-1: Manufacturer: SanDisk
usb 1-1: SerialNumber: 2845000ED2412006
usb 1-1: configuration #1 chosen from 1 choice
scsi0 : SCSI emulation for USB Mass Storage devices
scsi 0:0:0:0: Direct-Access    SanDisk U3 Titanium        7.01 PQ: 0 ANSI: 0 CCS

sd 0:0:0:0: [sda] 7856127 512-byte hardware sectors: (4.02 GB/3.74 GiB)
sd 0:0:0:0: [sda] Write Protect is off
sd 0:0:0:0: [sda] Assuming drive cache: write through
sd 0:0:0:0: [sda] 7856127 512-byte hardware sectors: (4.02 GB/3.74 GiB)
sd 0:0:0:0: [sda] Write Protect is off
sd 0:0:0:0: [sda] Assuming drive cache: write through
 sda: sda1
sd 0:0:0:0: [sda] Attached SCSI removable disk
FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will b
e case sensitive!
    
```

In fact corresponds to the device USB device called /dev/udisk. Enter /udisk directory, you can see the inside of the document.

Note: if your USB does not recognize, please check it is not FAT32/VFAT format

```

ttySO - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# cd /udisk
[root@FriendlyARM /udisk]# ls
2489172.pdf
Adspend forecasts March 2008.pdf
GF7050VIMS
bootlog.prv
bootlog.txt
command.com
initwlan0.sh
io.sys
mcp73
mini2440-20090616-eng
msdos.sys
netbeans-6.5.1-ml-javase-linux.sh
qt-sdk-linux-x86-opensource-2009.02.bin
zImage_a70_20090526.tgz
[root@FriendlyARM /udisk]#
    
```

2.5.4 SD Card

Same as the USB, SD card is the automatic identification of the mount, insert the SD card can be seen in the following serial information:

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /sdcard]# ls
[root@FriendlyARM /sdcard]# cd
[root@FriendlyARM /]# umount sdcard
[root@FriendlyARM /]# umount /sdcard
umount: can't umount /sdcard: Invalid argument
[root@FriendlyARM /]# mmc0: card 8001 removed
s3c2440-sdi s3c2440-sdi: powered down.
s3c2440-sdi s3c2440-sdi: running at 0kHz (requested: 0kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 198kHz (requested: 197kHz).
s3c2440-sdi s3c2440-sdi: running at 16875kHz (requested: 25000kHz).
s3c2440-sdi s3c2440-sdi: running at 16875kHz (requested: 25000kHz).
mmc0: new SD card at address 8001
mmcblk0: mmc0:8001 SD01G 968 MiB
mmcblk0: p1
FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will be case sensitive!
[root@FriendlyARM /]#
    
```

The system will automatically create /sdcard directory and SD equipment automatically mounted to the above figure:

```

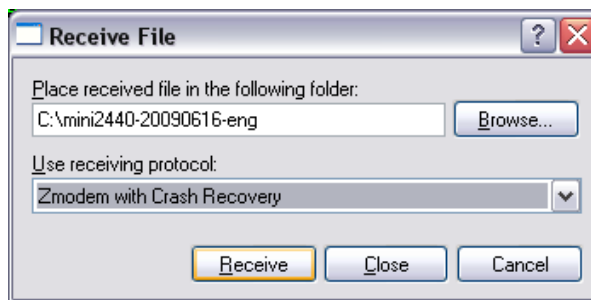
ttyS0 - HyperTerminal
File Edit View Call Transfer Help
s3c2440-sdi s3c2440-sdi: running at 16875kHz (requested: 25000kHz).
mmc0: new SD card at address 8001
mmcblk0: mmc0:8001 SD01G 968 MiB
mmcblk0: p1
FAT: utf8 is not a recommended IO charset for FAT filesystems, filesystem will be case sensitive!
[root@FriendlyARM /]# ls /sdcard
initwlan0.sh          zImage_a70_20090526.tgz
netbeans-6.5.1-ml-javase-linux.sh
[root@FriendlyARM /]# mount
rootfs on / type rootfs (rw)
/dev/root on / type yaffs (rw)
none on /proc type proc (rw)
none on /sys type sysfs (rw)
none on /proc/bus/usb type usbfs (rw)
none on /dev type ramfs (rw)
none on /dev/pts type devpts (rw,mode=622)
tmpfs on /dev/shm type tmpfs (rw)
none on /tmp type ramfs (rw)
none on /var type ramfs (rw)
/dev/sdcard on /sdcard type vfat (rw, sync, nosuid, nodev, noatime, nodiratime, fmask=0000, dmask=0000, allow_utime=0022, codepage=cp936, iocharset=utf8)
[root@FriendlyARM /]# _
    
```

2.5.5 Serial Transmission with other PC through Serial

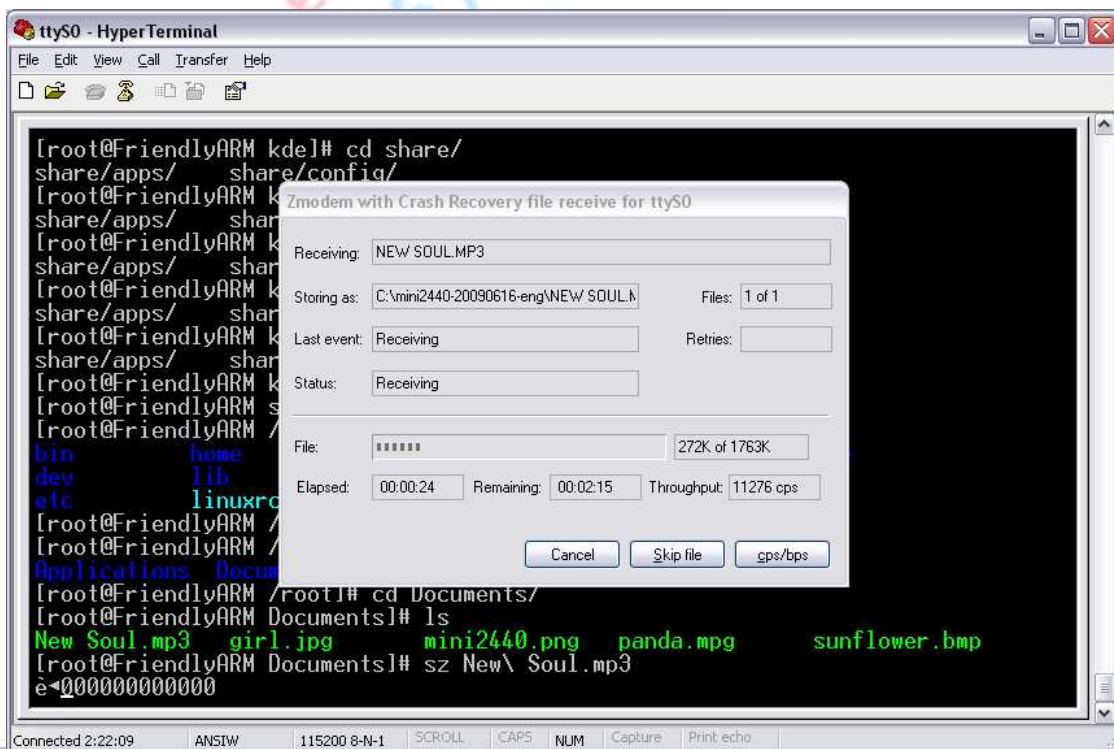
When logged on to the system through the serial port after the terminal, you can use the “sz” or “rz” command with the PC through the serial port to send each other text cases, the specific operation is as follows.

(1) “sz” send files to the PC

In the HyperTerminal window, click the right mouse button in the pop-up menu, select "Receive File" to set up to receive text parts catalog and agreement, as shown.

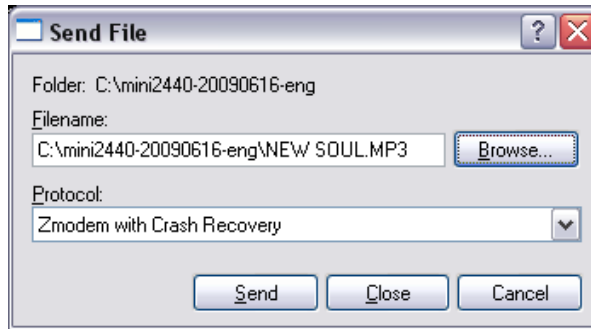


And then in the terminal enter the command line "sz / new soul.mp3" order sent to the PC is located in "/" directory new soul.mp3 file (or other file, change the path and file name as you need), because its large file, wait a few minutes to take, after sent completed, the system will automatically save the file to the directory you set up, see figure.

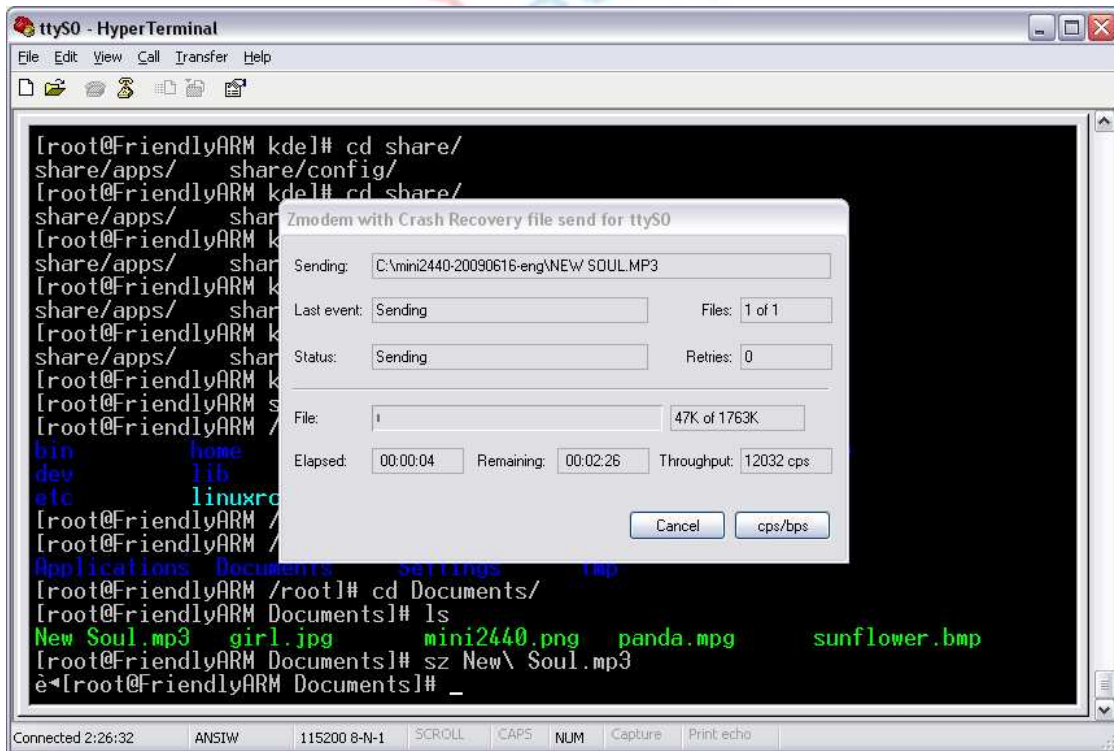


(2) "rz" download files to development board

In the serial input terminal "rz" command to start receiving files from the PC. And then in the HyperTerminal window, click the right mouse button in the pop-up menu, select "Send File", is set up to the paper and the use of the agreement, as shown, to the development board to send the file.



Click "Send", the development board to start receiving a file, as shown.



Transfer completed, will be the same under the current directory of the document file name, you can use the md5sum command to verify whether the document and the same source file.

```
[root@FriendlyARM /]# cd root
[root@FriendlyARM /root]# ls
Applications  Documents  Settings  tmp
[root@FriendlyARM /root]# cd Documents/
[root@FriendlyARM Documents]# ls
New Soul.mp3  girl.jpg  mini2440.png  panda.mpg  sunflower.bmp
[root@FriendlyARM Documents]# sz New\ Soul.mp3
[root@FriendlyARM Documents]# md5sum New\ Soul.mp3
d6ff7d2f5c01ba1db1ffbbfc479a9a71 New Soul.mp3
[root@FriendlyARM Documents]#
```

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2.5.6 LED Panel Control

Test Name: led-player leds		Remarks
Source Code Filename	led-player.c led.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/leds	
Kernel Driver Source Code	Linux-2.6.29/drivers/ char/mini2440_leds.c	
Others:		

Name: leds.cgi		Remarks
Source Code Name	leds.cgi	In the development of plate
Location on the CD-ROM	\www directory in the development board	
<p>Description:</p> <p>leds.cgi is a shell script file, it is not a binary process, and the script has been through leds.html call, which is the most common use of the web page design techniques.</p> <p>CD-ROM in root_default.tgz decompression can also be one of the www directory leds.cgi and leds.html files, they are scripts; source code itself, using any text editor (such as Windows "Notepad ") can be opened.</p>		

Description: Led-player and through the website are friendly LED control arm of the early development of the summary to show SBC2410 case procedures, because the hardware

has nothing to do, so can be easily transplanted to other systems. Some books currently on the market, some 2410/2440 development board manufacturers have adopted the typical application example of the pipeline.

(1) LED servers

Boot into the system will automatically run an LED service program (/etc/rc.d/init.d/leds), it is a matter of fact is led-player called a script, led-player running, it will in the /tmp directory to create a led-control pipeline document sent to the pipeline can change different parameters of the blinking led mode:

```
#echo 0 0.2> /tmp/led-control
```

Run this command, the four users will be led by 0.2 seconds each time interval running marquee.

```
#echo 1 0.2> /tmp/led-control
```

Run this command, the four users will be led to the time interval of 0.2 seconds to run accumulator.

```
#/etc/rc.d/init.d/leds stop
```

Run this command, the four user led will stop flashing.

```
#/etc/rc.d/init.d/leds start
```

Run this command, the four users will re-start flashing led.



(2) Separate control of LED

/bin/leds can be controlled is a single utility that led to the use of leds must first stop led-player, such as under the command:

```
#/etc/rc.d/init.d/leds stop
```

The order will be led-player to stop the manipulation of the led. led to use are as follows:

```
[root@fa/] #led
```

Usage: leds led_no 0 | 1

led_no is to operate led (for 0,1,2,3), 0 and 1, respectively, and lit on behalf of the closure.

```
#led 2 1
```

LED3 will light up.



2.5.7 Keyboard Test

Test Name: buttons		Remarks
Source Code Filename	buttons_test.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/buttons	
Kernel Driver Source Code	Linux-2.6.29/drivers /char/mini2440_buttons.c	
Others:		

In the command line enter "buttons" command, and then press the button on the board to develop, you can display the corresponding key figure

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# cd root
[root@FriendlyARM /root]# ls
Applications Documents Settings tmp
[root@FriendlyARM /root]# cd Documents/
[root@FriendlyARM Documents]# ls
New Soul.mp3  girl.jpg      mini2440.png  panda.mpg     sunflower.bmp
[root@FriendlyARM Documents]# sz New\ Soul.mp3
[root@FriendlyARM Documents]# md5sum New\ Soul.mp3
d6ff7d2f5c01ba1db1ffbffc473a9a71 New Soul.mp3
[root@FriendlyARM Documents]# button
-/bin/sh: button: not found
[root@FriendlyARM Documents]# cd
[root@FriendlyARM /]# button
-/bin/sh: button: not found
[root@FriendlyARM /]# buttons
key 1 is down
key 1 is up
key 2 is down
key 2 is up
key 3 is down
key 3 is up
key 5 is down
key 5 is up

```

2.5.8 Serial Port 2 and 3 Test

Test Name: armcomtest		Remarks
Source Code Filename	comtest.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/ttySAC0, 1,2 or /dev/ttyUSB0, 1,2,3 ...	
Kernel Driver Source Code	Linux-2.6.29/drivers /serial/s3c2440.c	
Others:		

Description: armcomtest is arm-friendly in order to facilitate the testing and development under linux serial terminal simple practical way sequence, which uses standard system calls, and hardware has nothing to do most of the program can run on armv4 platform use, the program does not provide the source code.

Tip: System is activated, the corresponding 0,1,2 serial device name of /dev/ttySAC0,1,2

Test serial port 2 would need help from another with a serial port of the PC, we offer the use of serial lines and expansion of small board (optional accessory) to connect good COM2 and another PC serial port, and mentioned above Set the PC terminal baud rate of 115200 super, no flow control, the other by default.

In the command line, enter:

```
#armcomtest -d /dev/ttySAC1 -o
```

Enter the characters at this time if another PC in the emergence of super-terminal, and vice versa.

If you want to test serial port 3, you need to connect a small expansion board COM3, and in the command line type:

```
#armcomtest -d /dev/ttySAC2 -o
```

The following is a testing of the interface:

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /root]# cd Documents/
[root@FriendlyARM Documents]# ls
New Soul.mp3  girl.jpg      mini2440.png  panda.mpg     sunflower.bmp
[root@FriendlyARM Documents]# sz New\ Soul.mp3
[root@FriendlyARM Documents]# md5sum New\ Soul.mp3
d6ff7d2f5c01ba1db1ffbbfc473a9a71 New Soul.mp3
[root@FriendlyARM Documents]# button
-/bin/sh: button: not found
[root@FriendlyARM Documents]# cd
[root@FriendlyARM /]# button
-/bin/sh: button: not found
[root@FriendlyARM /]# buttons
key 1 is down
key 1 is up
key 2 is down
key 2 is up
key 3 is down
key 3 is up
key 5 is down
key 5 is up
^C
[root@FriendlyARM /]# armcomtest -d /dev/ttySAC1 -o
abcdefghijklmnopqrstuvwxyz

```

Connected 2:49:53 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

2.5.9 Test Buzzer

Test Name: pwm_tset		Remarks
Source Code Filename	pwm_test.c	
Location on the CD-ROM	linux/examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/pwm	
Kernel Driver Source Code	Linux-2.6.29/drivers/char/pwm.c	
Other		

Kinds of input in the command line: pwm_test

Can hear the sound of the buzzer, press the "+" or "-" to change the output frequency, figure.

Press ESC key to suspend the test.

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
Try to bring eth0 interface up.....eth0: link down
Done
Please press Enter to activate this console.
[root@FriendlyARM /]# pwm_test

BUZZER TEST ( PWM Control )
Press +/- to increase/reduce the frequency of the BUZZER
Press 'ESC' key to Exit this program

    Freq = 1000
    Freq = 1010
    Freq = 1020
    Freq = 1030
    Freq = 1020
    Freq = 1010
    Freq = 1000
    Freq = 990
    Freq = 980
    Freq = 970
    Freq = 960
    Freq = 950
    Freq = 940
[root@FriendlyARM /]# _
    
```

2.5.10 Control of LCD Backlight

Tip:

LCD backlight device file: /dev/backlight

Kinds of input in the command line: echo 0> /dev/backlight can turn off LCD backlight.

Kinds of input in the command line: echo 1> /dev/backlight can turn on LCD backlight.

2.5.11 I2C-EEPROM Test

Name of test procedure: i2c		Remarks
Source Code Filename	eeeprom.c 24cXX.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/i2c/0	
Kernel Driver Source Code	Linux-2.6.29/drivers /i2c/busses/i2c-s3c2440.c	
Others:		

Tip: I2C-EEPROM device file name: /dev/i2c/0

Species in the command-line input: i2c-w to the board to write the data in the 24C08 device (0x00-0xff)

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# i2c -w
Freq = 950
Freq = 940
Open /dev/i2c/0 with 8bit mode
Writing 0x00-0xff into 24C08

0000| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
0010| 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
0020| 20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f
0030| 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
0040| 40 41 42 43 44 45 46 47 48 49 4a 4b 4c 4d 4e 4f
0050| 50 51 52 53 54 55 56 57 58 59 5a 5b 5c 5d 5e 5f
0060| 60 61 62 63 64 65 66 67 68 69 6a 6b 6c 6d 6e 6f
0070| 70 71 72 73 74 75 76 77 78 79 7a 7b 7c 7d 7e 7f
0080| 80 81 82 83 84 85 86 87 88 89 8a 8b 8c 8d 8e 8f
0090| 90 91 92 93 94 95 96 97 98 99 9a 9b 9c 9d 9e 9f
00a0| a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 aa ab ac ad ae af
00b0| b0 b1 b2 b3 b4 b5 b6 b7 b8 b9 ba bb bc bd be bf
00c0| c0 c1 c2 c3 c4 c5 c6 c7 c8 c9 ca cb cc cd ce cf
00d0| d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 da db dc dd de df
00e0| e0 e1 e2 e3 e4 e5 e6 e7 e8 e9 ea eb ec ed ee ef
00f0| f0 f1 f2 f3 f4 f5 f6 f7 f8 f9 fa fb fc fd fe ff

[root@FriendlyARM /]# _

```

Enter the command line: i2c-r of 24C08 from the board to read out the output device

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
00f0| f0 f1 f2 f3 f4 f5 f6 f7 f8 f9 fa fb fc fd fe ff
[root@FriendlyARM /]# i2c -r
Open /dev/i2c/0 with 8bit mode
Reading 256 bytes from 0x0

0000| 00 01 02 03 04 05 06 07 08 09 0a 0b 0c 0d 0e 0f
0010| 10 11 12 13 14 15 16 17 18 19 1a 1b 1c 1d 1e 1f
0020| 20 21 22 23 24 25 26 27 28 29 2a 2b 2c 2d 2e 2f
0030| 30 31 32 33 34 35 36 37 38 39 3a 3b 3c 3d 3e 3f
0040| 40 41 42 43 44 45 46 47 48 49 4a 4b 4c 4d 4e 4f
0050| 50 51 52 53 54 55 56 57 58 59 5a 5b 5c 5d 5e 5f
0060| 60 61 62 63 64 65 66 67 68 69 6a 6b 6c 6d 6e 6f
0070| 70 71 72 73 74 75 76 77 78 79 7a 7b 7c 7d 7e 7f
0080| 80 81 82 83 84 85 86 87 88 89 8a 8b 8c 8d 8e 8f
0090| 90 91 92 93 94 95 96 97 98 99 9a 9b 9c 9d 9e 9f
00a0| a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 aa ab ac ad ae af
00b0| b0 b1 b2 b3 b4 b5 b6 b7 b8 b9 ba bb bc bd be bf
00c0| c0 c1 c2 c3 c4 c5 c6 c7 c8 c9 ca cb cc cd ce cf
00d0| d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 da db dc dd de df
00e0| e0 e1 e2 e3 e4 e5 e6 e7 e8 e9 ea eb ec ed ee ef
00f0| f0 f1 f2 f3 f4 f5 f6 f7 f8 f9 fa fb fc fd fe ff

[root@FriendlyARM /]# _

```

2.5.12 AD Converter Test

Test procedure name: adc-test		Remarks
Source Code Filename	adc-test.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/adc	
Kernel Driver Source Code	Linux-2.6.29/drivers /char/mini2440_adc.c	
Others:		

In the command-line input `adc-test` command, ADC converter can be carried out to test, regulate the development of the adjustable resistor W1, we can see from the serial output terminal of the conversion results.

```

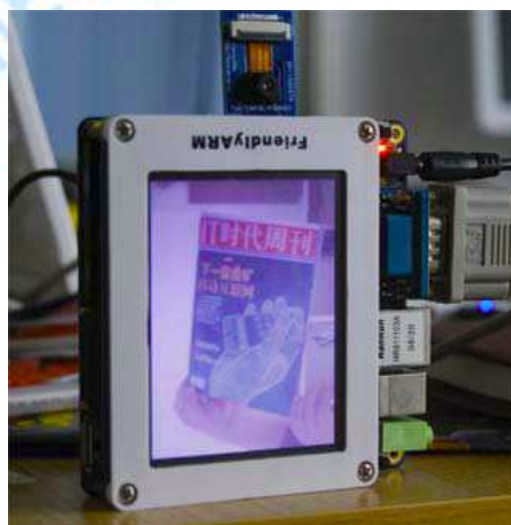
ttyS0 - HyperTerminal
File Edit View Call Transfer Help
0090| 90 91 92 93 94 95 96 97 98 99 9a 9b 9c 9d 9e 9f
00a0| a0 a1 a2 a3 a4 a5 a6 a7 a8 a9 aa ab ac ad ae af
00b0| b0 b1 b2 b3 b4 b5 b6 b7 b8 b9 ba bb bc bd be bf
00c0| c0 c1 c2 c3 c4 c5 c6 c7 c8 c9 ca cb cc cd ce cf
00d0| d0 d1 d2 d3 d4 d5 d6 d7 d8 d9 da db dc dd de df
00e0| e0 e1 e2 e3 e4 e5 e6 e7 e8 e9 ea eb ec ed ee ef
00f0| f0 f1 f2 f3 f4 f5 f6 f7 f8 f9 fa fb fc fd fe ff

[root@FriendlyARM /]# adc-test
press Ctrl-C to stop
ADC Value: 526
ADC Value: 526
ADC Value: 526
ADC Value: 527
ADC Value: 526
ADC Value: 526
ADC Value: 526
ADC Value: 526
ADC Value: 526
ADC Value: 524
ADC Value: 526
ADC Value: 526
ADC Value: 526
^C
[root@FriendlyARM /]# _
    
```

2.5.13 Dynamic CMOS Camera Preview

Test Name: camtest		Remarks
Source Code Filename	camtest.c	
Location on the CD-ROM	linux\examples.tgz (decompression)	
Cross Compiler	Arm-linux-gcc-4.3.2 with EABI	
On-board Development Device Name	/dev/camera	
Kernel Driver Source Code	Linux-2.6.29/drivers /media/video/s3c2440camif.c	
Others:		

The CAM130 camera module development board into the CAMERA interface, open the power supply into the command-line terminal, enter the camtest command line command, you can see the dynamic CMOS camera preview screen, figure



2.5.14 Telnet

Telnet is a frequently used tool for remote login, use the telnet function, you can log on from the development board to it's provide a telnet server host, if you access the network development board on the Internet, you can telnet external command log bbs. First of all, the development board to confirm whether the IP address of 192.168.1.230, and whether the other host and LAN-phase Qualcomm, the information for a successful figure.

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# ifconfig
eth0    Link encap:Ethernet  HWaddr 08:90:90:90:90:90
        inet addr:192.168.1.230  Bcast:192.168.1.255  Mask:255.255.255.0
        UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
        RX packets:33  errors:0  dropped:0  overruns:0  frame:0
        TX packets:21  errors:0  dropped:0  overruns:0  carrier:0
        collisions:0  txqueuelen:1000
        RX bytes:3039 (2.9 KiB)  TX bytes:1834 (1.7 KiB)
        Interrupt:51

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:3  errors:0  dropped:0  overruns:0  frame:0
        TX packets:3  errors:0  dropped:0  overruns:0  carrier:0
        collisions:0  txqueuelen:0
        RX bytes:336 (336.0 B)  TX bytes:336 (336.0 B)

[root@FriendlyARM /]# ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=0 ttl=255 time=1.133 ms
64 bytes from 192.168.1.1: seq=1 ttl=255 time=0.974 ms
64 bytes from 192.168.1.1: seq=2 ttl=255 time=0.970 ms
-
    
```

Connected 0:45:51 ANSIW :115200 8-N-1 SCROLL CAPS NUM Capture Print echo

And then set up routing IP: route add default gw 192.168.1.1

Finally, the use of telnet to log in order to log in to any telnet host. This example is freeshell.org.

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# route add default gw 192.168.1.1
route: SIOCADDRT: File exists
[root@FriendlyARM /]# telnet freeshell.org

Entering character mode
Escape character is '^]'.

sdf.lonestar.org (ttypJ)
if new, login 'new' ..

login: Login timed out after 300 seconds
Connection closed by foreign host
[root@FriendlyARM /]#
    
```

Connected 1:01:26 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

ThaiEasyElec.com
 On-line Electronics Shop for Embedded System

2.5.15 How to Set Up Network to Access the Internet Website

First of all, to ensure that your network environment the Internet can be a normal landing, please take note of your network environment used for IP Gateway Address, for example, here in my 192.168.1.1, then use the route set:

```
#Route add default gw 192.168.1.1
```

Then you can directly access the Internet, the number of IP addresses, such as ping some of the ThaiEasyElec website (its IP Address is 203.151.233.154):

```
#ping www.thaieasyelec.com
```

As can be shown that outside the network ping pass:

The screenshot shows a HyperTerminal window titled 'ttyS0 - HyperTerminal'. The terminal output is as follows:

```
[root@FriendlyARM /]# route add default gw 192.168.1.1
route: SIOCADDRT: File exists
[root@FriendlyARM /]# telnet freeshell.org

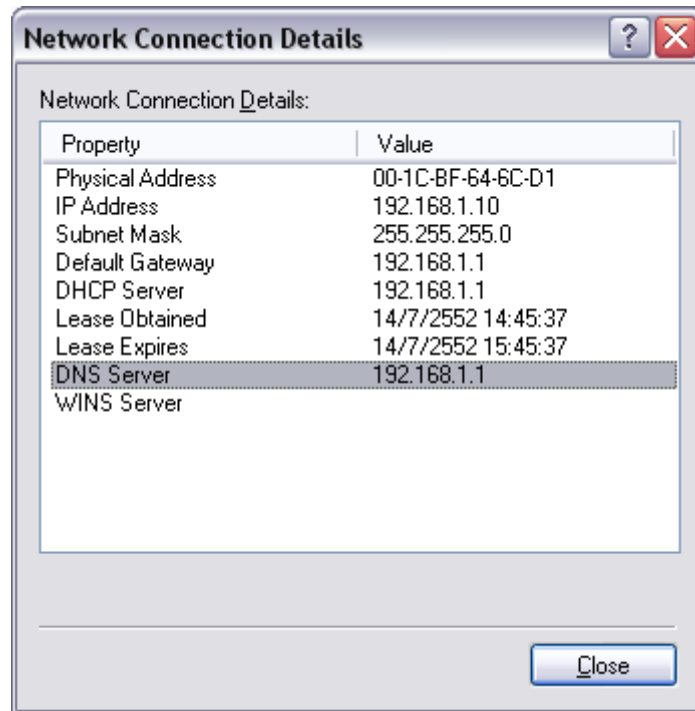
Entering character mode
Escape character is '^]'.

sdf.lonestar.org (ttypJ)
if new, login 'new' ..

login: Login timed out after 300 seconds
Connection closed by foreign host
[root@FriendlyARM /]# ping www.thaieasyelec.com
PING www.thaieasyelec.com (203.151.233.154): 56 data bytes
64 bytes from 203.151.233.154: seq=0 ttl=53 time=27.092 ms
64 bytes from 203.151.233.154: seq=1 ttl=53 time=40.010 ms
64 bytes from 203.151.233.154: seq=2 ttl=53 time=27.057 ms
^C
--- www.thaieasyelec.com ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 27.057/31.386/40.010 ms
[root@FriendlyARM /]#
```

The status bar at the bottom of the window shows: Connected 1:09:31, ANSIW, 115200 8-N-1, SCROLL, CAPS, NUM, Capture, Print echo.

Qualcomm to be able to ping the external network real-name Web site, also need to set up DNS servers, when you first look before the network's DNS server to use IP address (ask your network administrator).



For example, DNS server IP here for "192.168.1.1", in the development board in this set:

```
# rm /etc/resolv.conf ;first delete the previous configuration file
# touch /etc/resolv.conf ;regenerate a resolv.conf file
# echo nameserver 192.168.1.1 >> /etc/resolv.conf ;the use of the actual configuration of the
DNS server IP resolv.conf file
```

Here is mainly to modify /etc/resolv.conf file, of course, you can directly modify the use of vi. Whole process as follows:

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# rm /etc/resolv.conf
[root@FriendlyARM /]# touch /etc/resolv.conf
[root@FriendlyARM /]# echo nameserver 192.168.1.1 >> /etc/resolv.conf
[root@FriendlyARM /]# cat /etc/resolv.conf
nameserver 192.168.1.1
[root@FriendlyARM /]# ping www.thaieasyelec.com
PING www.thaieasyelec.com (203.151.233.154): 56 data bytes
64 bytes from 203.151.233.154: seq=0 ttl=53 time=27.076 ms
64 bytes from 203.151.233.154: seq=1 ttl=53 time=41.818 ms
64 bytes from 203.151.233.154: seq=2 ttl=53 time=57.690 ms
64 bytes from 203.151.233.154: seq=3 ttl=53 time=37.118 ms
^C
--- www.thaieasyelec.com ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 27.076/40.925/57.690 ms
[root@FriendlyARM /]# _
    
```

Connected 1:15:31 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

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2.5.16 How to Set MAC Address

Development board used in the MAC address is "soft" in nature, so you can order it through ifconfig reset in order to adapt to a network in the same environment of multi-chip development board, the concrete operation is as follows:

The first to use ifconfig to check the MAC Address of the current run:

ifconfig ;attention to the contents of the back not to tell any

```

64 bytes from 203.151.233.154: seq=3 ttl=53 time=37.118 ms
^C
--- www.thaieasyelec.com ping statistics ---
4 packets transmitted, 4 packets received, 0% packet loss
round-trip min/avg/max = 27.076/40.925/57.690 ms
[root@FriendlyARM /]# ifconfig
eth0      Link encap:Ethernet  HWaddr 08:90:90:90:90:90
          inet addr:192.168.1.230  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1042 errors:0 dropped:0 overruns:0 frame:0
          TX packets:156 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:99510 (97.1 KiB)  TX bytes:11212 (10.9 KiB)
          Interrupt:51

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:3 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:336 (336.0 B)  TX bytes:336 (336.0 B)

[root@FriendlyARM /]# _
    
```

Can see that the current MAC Address "08:90:90:90:90:90", which is in the default network card driver MAC Address, it has been written to the core of the death, unless the driver to change the network adapter source code and recompile a new kernel. To running the system Dynamic change MAC Address, to close the current network and reset the MAC Address using ifconfig:

```
#ifconfig eth0 down
```

```
#ifconfig eth0 hw ether 00:11:AA:BB:CC:DD ;tips: a, b, c, d, e, f can be lowercase
```

Open network and set up after the use of ifconfig to view the MAC Address, ping tests the network using the still can pass:

```
#ifconfig eth0 up
```

```
#ifconfig
```

```
#ping 192.168.1.1
```

```

ttyS0 - HyperTerminal
File Edit View Call Transfer Help
[root@FriendlyARM /]# eth0: link up, 100Mbps, full-duplex, lpa 0x45E1
[root@FriendlyARM /]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:11:AA:BB:CC:DD
          inet addr:192.168.1.230  Bcast:192.168.1.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1513 errors:0 dropped:0 overruns:0 frame:0
          TX packets:156 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:148099 (144.6 KiB)  TX bytes:11212 (10.9 KiB)
          Interrupt:51

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:3 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:336 (336.0 B)  TX bytes:336 (336.0 B)

[root@FriendlyARM /]# ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq=1 ttl=255 time=1.498 ms
    
```

Connected 2:03:20 ANSIW 115200 8-N-1 SCROLL CAPS NUM Capture Print echo

2.5.17 How to Telnet Remote Login to Development Board

Development board running after boot, in fact, has initiated a Telnet service, so users can also network remote login to development board. In the Windows command line window enter "telnet 192.168.1.230", Figure login screen appears, enter "root" (Does not require a password) into the system.

```

c:\ Telnet 192.168.1.230
Kernel 2.6.29.4-FriendlyARM on </dev/pts/0>
FriendlyARM login: root
[root@FriendlyARM /]# ls
bin          home        lost+found  root        tmp         www
dev          lib         opt         sbin       usr
etc          linuxrc    proc        sys         var
[root@FriendlyARM /]#
    
```

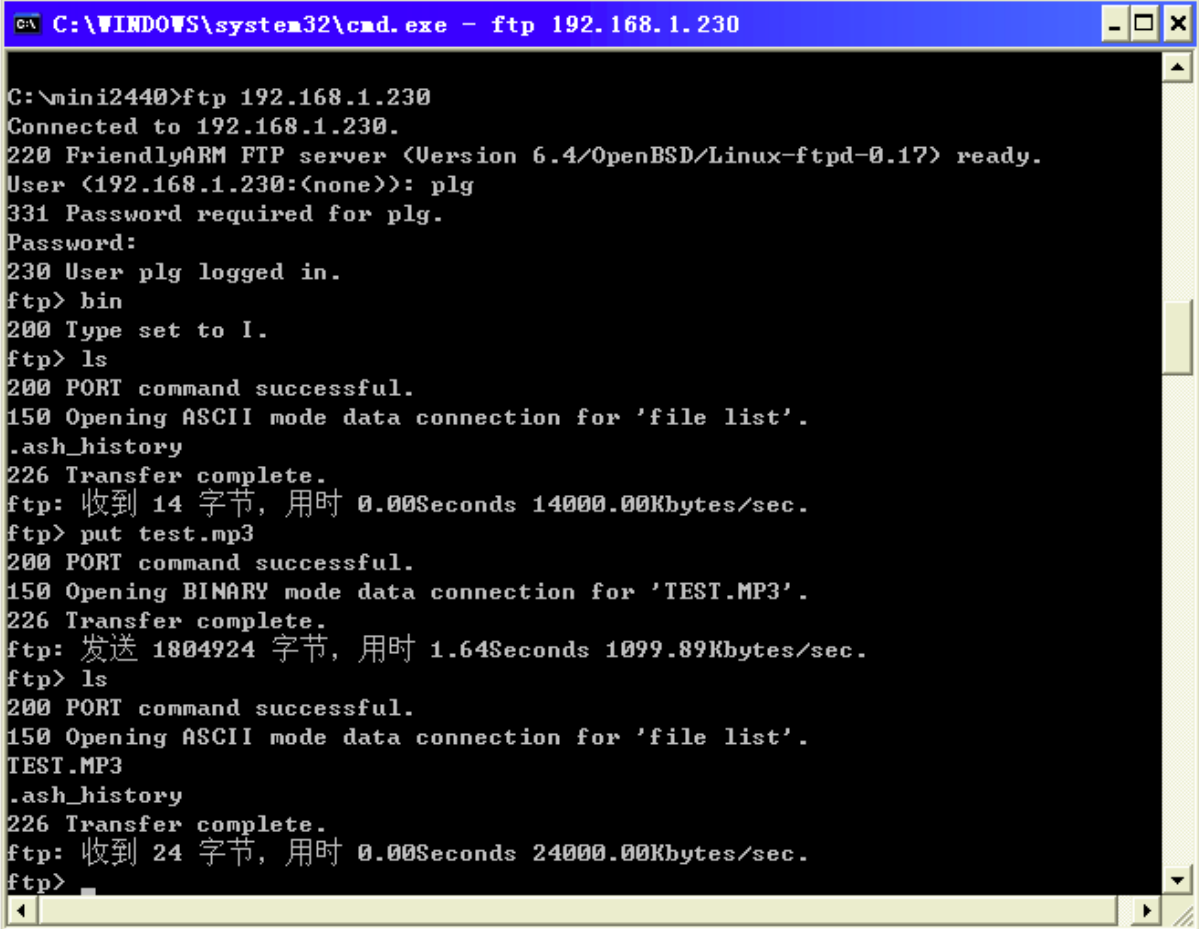
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2.5.18 Use the FTP File Transfer

In the linux or windows system, installed after the general command-line, bringing a range of the ftp command sequence, use the ftp host can log in remotely and transfer files, FTP. This requires the host to provide services and the corresponding authority; Mini2440 development board not only with ftp command, also launched boot ftp services. In order to facilitate the testing, we can from the PC-log on the command line window development board, development board to transfer files.

Note: Make sure you run the ftp directory where there is a need to upload files, this is test.mp3 transmission has finished, you can see the target in the serial terminal board /home/plg directory test.mp3 more than a document.



```
C:\WINDOWS\system32\cmd.exe - ftp 192.168.1.230

C:\mini2440>ftp 192.168.1.230
Connected to 192.168.1.230.
220 FriendlyARM FTP server (Version 6.4/OpenBSD/Linux-ftpd-0.17) ready.
User (192.168.1.230:(none)): plg
331 Password required for plg.
Password:
230 User plg logged in.
ftp> bin
200 Type set to I.
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for 'file list'.
.ash_history
226 Transfer complete.
ftp: 收到 14 字节, 用时 0.00Seconds 14000.00Kbytes/sec.
ftp> put test.mp3
200 PORT command successful.
150 Opening BINARY mode data connection for 'TEST.MP3'.
226 Transfer complete.
ftp: 发送 1804924 字节, 用时 1.64Seconds 1099.89Kbytes/sec.
ftp> ls
200 PORT command successful.
150 Opening ASCII mode data connection for 'file list'.
TEST.MP3
.ash_history
226 Transfer complete.
ftp: 收到 24 字节, 用时 0.00Seconds 24000.00Kbytes/sec.
ftp>
```

2.5.19 Control LED Panel through the Webpage

In the web server to test the mid-point "Network Control LED Test" items, there will be testing LED control page figure.



You can use the page in all test items to test, in which the "LED test" will be through the CGI process order to control the LED lights on the board, including two kinds of forms of display type and display three different speeds.

If you want to stop the web server in the command prompt type the following command:

```
#/etc/rc.d/init.d/httpd stop
```

To restart it, type:

```
#/etc/rc.d/init.d/httpd start
```

2.5.20 How to Use mounted NFS Network File System

Prior to conducting the test, first set up in accordance with 4.3 a good NFS server system, and then enter the command line to under the command (assuming the server's IP address is 192.168.1.111):

```
#mount -t nfs -o nolock 192.168.1.111: /opt/FriendlyARM/mini2440/root_nfs/mnt
```

Successfully mounted, you can enter the /mnt directory to operate, and as shown below. Cancellation of orders articulated as follows:

```
#umount /mnt
```

The screenshot shows a terminal window titled '超级终端' (Super Terminal) with a menu bar and toolbar. The terminal output is as follows:

```
[25/Jun/2007:
[root@FriendlyARM /]# clearg server pid=274, port 80+<

[root@FriendlyARM /]# mount -t nfs -o nolock 192.168.1.111:/opt/FriendlyARM/QQ2
40/root_nfs /mnt      挂接NFS网络文件系统到/mnt目录
[root@FriendlyARM /]# ls /mnt/
bin          lib          proc         usr
dev          linuxrc    /sbin        year
etc          tent        shanghai.tan.mp3  user
home        opt         tmp

[root@FriendlyARM /]# cd /mnt/
[root@FriendlyARM /mnt]# madplay shanghai.tan.mp3
MP3 Audio Decoder 0.15.0 (beta) - Copyright (C) 2000-2003 Robert Leslie et al.
Title: 上海滩
Artist: 叶丽仪
Year: 2000
Genre: Goa

播放网络文件系统中的mp3文件
```

At the bottom of the terminal window, there is a status bar with the following text: 已连接 2:43:34 ANSII 115200 8-N-1 SCROLL CAPS NUM 插 打印

2.5.21 USB Wireless Card

Linux-2.6.29 kernel has some of its own USB wireless network adapter drivers, including the most popular, and prices than the highest TP-Link USB WiFi wireless LAN: TL-WN321G+, the development board of the default kernel image have been added support this module.

NOTE: This manual section on the 6.3 kernel to configure the wireless card driver description insert the USB wireless network adapter board, it will result in the following information:

```
[root@FriendlyARM/]#usb 1-1: new full speed USB device using s3c2410-ohci and address 2
usb 1-1: New USB device found, idVendor = 148f, idProduct = 2573
usb 1-1: New USB device strings: Mfr = 1, Product = 2, SerialNumber = 0
usb 1-1: Product: 54M.USB .....
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration # 1 chosen from 1 choice
wmaster0 (rt73usb): not using net_device_ops yet
wlan0 (rt73usb): not using net_device_ops yet
[root@FriendlyARM/]#
```

This shows that have been identified to the wireless network adapter, and then through the steps to configure the command to start.

- (1) First turn off the wired network adapter board DM9000

```
[root@FriendlyARM/]#ifconfig eth0 down
```

- (2) Load the wireless USB WiFi adapter

```
[root@FriendlyARM/]#ifconfig wlan0 up
rt73usb 1-1:1.0: firmware: requesting rt73.bin
[root@FriendlyARM/]#
```

(3) Scan for available wireless networks

```
[root@FriendlyARM/]#iwlist scanning | grep ESSID
lo Interface doesn't support scanning.
eth0 Interface doesn't support scanning.
wmaster0 Interface doesn't support scanning.
ESSID: "FRIENDLY-ARM"
ESSID: "NETGEAR"
ESSID: "TP-LINK"
[root@FriendlyARM/]#
```

(4) Select the wireless network connection

```
[root@FriendlyARM/]#iwconfig wlan0 essid "FRIENDLY-ARM"
```

(5) Enter the network security password

```
[root@FriendlyARM/]#iwconfig wlan0 key s:12345
```

(6) Connected to the designated AP (Wireless Router)

```
[root@FriendlyARM/]#iwconfig wlan0 ap auto
```

(7) Set up a wireless network card's IP Address

```
[root@FriendlyARM/]#ifconfig wlan0 192.168.1.120
```

(8) Use ping command to state of connectivity in wireless networks detected

```
[root@FriendlyARM/]#ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq = 0 ttl = 64 time = 42.804 ms
64 bytes from 192.168.1.1: seq = 1 ttl = 64 time = 5.020 ms
64 bytes from 192.168.1.1: seq = 2 ttl = 64 time = 5.021 ms
```

Over the whole process as follows:

```
[root@FriendlyARM/]#usb 1-1: new full speed USB device using s3c2410-ohci and address 2
usb 1-1: New USB device found, idVendor = 148f, idProduct = 2573
usb 1-1: New USB device strings: Mfr = 1, Product = 2, SerialNumber = 0
usb 1-1: Product: 54M.USB .....
usb 1-1: Manufacturer: Ralink
usb 1-1: configuration # 1 chosen from 1 choice

wmaster0 (rt73usb): not using net_device_ops yet
wlan0 (rt73usb): not using net_device_ops yet
[root@FriendlyARM/]#ifconfig eth0 down
[root@FriendlyARM/]#ifconfig wlan0 up
rt73usb 1-1:1.0: firmware: requesting rt73.bin
[root@FriendlyARM/]#iwconfig wlan0 key s: 12345
[root@FriendlyARM/]#iwconfig wlan0 essid "FRIENDLY-ARM"
[root@FriendlyARM/]#iwconfig wlan0 ap auto
[root@FriendlyARM/]#ifconfig wlan0 192.168.1.120
[root@FriendlyARM/]#ping 192.168.1.1
PING 192.168.1.1 (192.168.1.1): 56 data bytes
64 bytes from 192.168.1.1: seq = 0 ttl = 64 time = 42.804 ms
64 bytes from 192.168.1.1: seq = 1 ttl = 64 time = 5.020 ms
64 bytes from 192.168.1.1: seq = 2 ttl = 64 time = 5.021 ms
^ C
--- 192.168.1.1 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 5.020/17.615/42.804 ms
[root@FriendlyARM/]#
```

2.5.22 Settings and Save Real-Time Clock

Linux change the way the general use of the time the order date, in order to bring the S3C2440 clock and the internal system clock with linux step-by-step, the general use hwclock command, is that they use the following methods:

```
(1)date -s 042916352007      # setup time to 2007-04-29 16:34
```

```
(2)hwclock -w              # to just set the time into the RTC internal S3C2440
```

(3)Boot when hwclock -s command to use to restore linux system clock for the RTC, the general statement to the add /etc/init.d/rcS file automatically.

Note: The system has provided us with the command hwclock-s write rcS file.

2.5.23 How to save the data down to the Flash

Since this system uses a file system that can read and write yaffs (in the embedded system, specifically the management of Flash memory file system), so the dynamic can easily save data will not be lost after power-down. Serial terminal after boot to run the following command:

```
#cp /shanghai.mp3 /home/plg
```

At this point in the /home/fa directory copy of a document of the same, and then shut down and re-open the system, you can view /home/plg file directory still exists.

2.5.24 How to setup the boot process to run automatically

Startup script with a variety of procedures can be set to run automatically after boot, you can set up other system settings, this is similar to Windows System Autobot automatic batch files, startup script is located in the board of the /etc/init.d/rcS, with capacity are as follows (the actual content may not be entirely consistent with this):

```
#!/bin/sh
PATH=/sbin:/bin:/usr/sbin:/usr/bin:/usr/local/bin:
runlevel=S
prevlevel=N
umask 022
export PATH runlevel prevlevel
#
# Trap CTRL-C & c only in this shell so we can interrupt subprocesses.
#
trap ":" INT QUIT TSTP
/bin/hostname FriendlyARM
/bin/mount-n-t proc none /proc
/bin/mount-n-t sysfs none /sys
/bin/mount-n-t usbfs none /proc/bus/usb
/bin/mount-t ramfs none /dev
echo /sbin/mdev > /proc/sys/kernel/hotplug
/sbin/mdev-s
/bin/hotplug
# Mounting file system specified in /etc/fstab
mkdir-p /dev/pts
mkdir-p /dev/shm
/bin/mount-n-t devpts none /dev/pts-o mode = 0622
/bin/mount-n-t tmpfs tmpfs /dev/shm
/bin/mount-n-t ramfs none /tmp
/bin/mount-n-t ramfs none /var
mkdir-p /var/empty
mkdir-p /var/log
mkdir-p /var/lock
mkdir-p /var/run
mkdir-p /var/tmp
/sbin/hwclock-s
```



```
syslogd
/etc/rc.d/init.d/netd start
echo "" > /dev/tty1
echo "Starting networking ..." > /dev/tty1
sleep 1
/etc/rc.d/init.d/httpd start
echo "" > /dev/tty1
echo "Starting web server ..." > /dev/tty1
sleep 1
/etc/rc.d/init.d/leds start
echo "" > /dev/tty1
echo "Starting leds service ..." > /dev/tty1
echo ""
sleep 1
/sbin/ifconfig lo 127.0.0.1
/etc/init.d/ifconfig-eth0 ;set up a static IP address of the boot, this is a
script, you can use vi to open and editor

#/bin/Qtopia &
echo "" > /dev/tty1
echo "Starting Qtopia, please waiting ..." > /dev/tty1
```

2.5.25 How to Create Screenshot

Command can use the snapshot on the current screenshot of the LCD display, and save it as png image format.

```
# snapshot pic.png
```

Implementation of the command will capture the current LCD display, and save it as a document pic.png.

