FriendlyARM mini2440
1. OVERVIEW.........................................................................................................................................................5

1.1 DESCRIPTION ..........................................................................................................................................................5
  1.1.1 Topview of Board...........................................................................................................................................6
  1.1.2 Hardware Features........................................................................................................................................6

1.2 HARDWARE RESOURCES ...................................................................................................................................8
  1.2.1 Memory Map and Chip Selection....................................................................................................................8
  1.2.2 Jumper.............................................................................................................................................................8
  1.2.3 Interfaces........................................................................................................................................................9

1.3 LINUX FEATURES ...............................................................................................................................................10

1.4 WINDOWS CE FEATURES ..................................................................................................................................11

2. HOW TO USE MINI2440......................................................................................................................................12

2.1 HARDWARE SETUP ............................................................................................................................................12
  2.1.1 Boot Mode.....................................................................................................................................................12
  2.1.2 External connection........................................................................................................................................12
  2.1.3 Hypterminal Setup.......................................................................................................................................13

2.2 BIOS FUNCTION ..................................................................................................................................................13
  2.2.1 Enter BIOS....................................................................................................................................................13
  2.2.2 Install USB Driver.......................................................................................................................................14
  2.2.3 Main Menu Function....................................................................................................................................15
  2.2.4 Partition Sub Menu Function......................................................................................................................17
  2.2.5 Linux Parameter Setup................................................................................................................................20

2.3 TEST PROGRAM WITHOUT OS..........................................................................................................................22
  2.3.1 Download 2440test.......................................................................................................................................22
  2.3.2 Hardware Test..............................................................................................................................................23

2.4 LINUX FUNCTION ..............................................................................................................................................29
  2.4.1 MP3 Play.........................................................................................................................................................29
  2.4.2 Stop a Program...............................................................................................................................................29
  2.4.3 Use U-Disk and Mobile Harddisk................................................................................................................29
  2.4.4 Use SD Card..................................................................................................................................................30
  2.4.5 Use USB Camera.........................................................................................................................................31
  2.4.6 Transfer file with PC....................................................................................................................................31
  2.4.7 Remotely display USB Camera....................................................................................................................31
  2.4.8 LED Control..................................................................................................................................................32
  2.4.9 Button Test...................................................................................................................................................33
  2.4.10 Serial 2 and 3 Test....................................................................................................................................33
  2.4.11 Beeper test..................................................................................................................................................34
  2.4.12 LCD Backlight...........................................................................................................................................34
  2.4.13 I2C Test.......................................................................................................................................................35
  2.4.14 Telnetd.........................................................................................................................................................36
  2.4.15 How to modify MAC address.......................................................................................................................37
  2.4.16 Ftpd.............................................................................................................................................................38
  2.4.17 Remote LED control....................................................................................................................................39
  2.4.18 NFS.............................................................................................................................................................39
  2.4.19 Remotely display USB Camera....................................................................................................................39
3. OS INSTALLATION..............................................................55

3.1 BACKUP AND RESTORE SYSTEM .........................55

3.2 INSTALL LINUX...............................................................59

3.2.1 Nand Flash Make Partition........................................60

3.2.2 BIOS Recovery............................................................60

3.2.3 Install Kernel...............................................................62

3.2.4 Install yaffs.................................................................63

3.2.5 Start OS.................................................................64

3.3 INSTALL WINCE..............................................................64

3.3.1 Nand Flash Make Partition........................................64

3.3.2 BIOS Recovery............................................................65

3.3.3 Install EBoot...............................................................66

3.3.4 Install Kernel...............................................................67

APPENDIX: OS INSTALLATION BY COMMAND LINE..............69

1. HOW TO ENTER COMMAND LINE MODE ..................69

1.1 From BIOS main menu..........................................................69

1.2 From Nand Flash boot..........................................................69
2. LINUX INSTALLATION ......................................................................................................................................70
   2.1 Nand Flash Make Partition.....................................................................................................................70
   2.2 BIOS Recovery........................................................................................................................................71
   2.3 Install Linux............................................................................................................................................72
   2.4 Install yaffs...........................................................................................................................................73
   2.5 Start OS................................................................................................................................................74
3. WINCE INSTALLATION....................................................................................................................................74
   3.1 Nand Flash Make Partition....................................................................................................................74
   3.2 BIOS Recovery......................................................................................................................................75
   3.3 Install EBoot.........................................................................................................................................76
   3.4 Install Kernel......................................................................................................................................77
1. Overview

1.1 Description

The MINI2440 is a single board computer based on Samsung S3C2440 microprocessor.
1.1.1 Topview of Board

1.1.2 Hardware Features

**CPU**
- Samsung S3C2440A 400MHz Max. 533Mhz

**SDRAM**
- 64M SDRAM
- 32bit DataBus
- SDRAM Clock 100MHz
Flash
- 64M or 128M Nand Flash,
- 2M Nor Flash,BIOS installed

LCD
- 4 wire resistive touch screen interface
- Up to 4096 color STN,3.5 inches to 12.1 inches, up to 1024x768 pixels
- Up to 64K color TFT,3.5 inches to 12.1 inches, up to 1024x768 pixels

Interface and Resource
- 1 10/100M Ethernet RJ-45(DM9000)
- 3 Serial Port
- 1 USB Host
- 1 USB Slave Type B
- 1 SD Card Interface
- 1 Stereo Audio out, 1 Micro In
- 1 20-Pin JTAG
- 4 USER LEDs
- 6 USER buttons
- 1 PWM Beeper
- 1 POT can be used for A/D converter adjust
- 1 AT24C08 for I2C test
- 1 20-Pin Camera Interface
- 1 Battery for RTC
- Power In(5V), with switch and lamp

Oscillator Frequency
- 12MHz

RTC
- Internal

Expand Interface
- 1 34-Pin 2.0mm GPIO
- 1 40-Pin 2.0mm System Bus

Dimension
- 100 x 100(mm)

OS Support
- Linux 2.6
- Android
- WinCE 5 and 6
1.2 Hardware Resource

1.2.1 Memory Map and Chip Selection

S3C2440 support 2 boot mode: Nand Flash boot and Nor Flash boot. Memory map and chip selection is different based on different boot mode:

For Nand Flash Boot, 4k Bytes BootSram mapped to nGCS0 space
For Nor Flash Boot, Nor Flash mapped to nGCS0 space
SDRAM address space: 0x30000000-0x34000000

1.2.2 Jumpers

MINI2440 has 1 Jumper, J2:
(1) J2 Power voltage selection for LCD module
    3.5” LCD → 5V
    7.0” LCD → 5V
1.2.3 Interfaces
1.3 Linux Features

**Version**
- Linux 2.6

**File system**
- yaffs
- cramfs
- Ext2
- Fat32
- NFS

**Basic driver(with source code)**
- 3 serial driver
- DM9000 driver
- Audio driver
- RTC driver
- LED driver
- USB Host driver
- LCD driver
- Touch screen driver
- USB camera
- USB mouse, keyboard, U-disk, mobile-disk
- SD Card driver

**Linux Application**
- busybox1.2.0
- Telnet 
- Ftp 
- inetd
- boa(web server)
- madplay
- snapshot
- ishow
- ifconfig 
- ping 
- route

**Embedded GUI(with source code)**
- Qt/Embedded
1.4 Windows CE Features

Version
- WindowsCE.net 5.0

Features
- DM9000 driver(source code)
- USB keyboard □ USB mouse □ USB disk □ mobile hard disk
- 3 serial port COM driver
- USB ActiveSync
- Audio driver
- SD driver
- Real time clock
- Registry saving
- Flash save when power lost
- Screen rotating

Default features(Simplify Chinese)
- XP style interface
- Windows Media Player 9.0(mp3, mpeg2, mpeg4, wmv, wav)
- Super Player
- Photo viewer, Note Pad
- IE6
- ftp, telnet, httpd server
- COM debugger
2. How to use MINI2440

Linux images were loaded before shipment (supervivi zImage_n35 root_default.img) Note the procedures below will be run under Windows.

2.1 Hardware Setup

2.1.1 Boot Mode

Boot mode can be selected by S2, according words on silk screen:
S2 connect to Nor Flash side system will boot from Nor Flash
S2 connect to Nand Flash side system will boot from Nand Flash

BIOS which pre-loaded in Nor Flash and Nand Flash are the same in shipment. By default, S2 had been connected to Nand Flash.

2.1.2 External connection

1. Connect serial port 0 to PC COM port by a dummy modem cable
2. Connect Ethernet port to PC by a cross cable
3. Connect DC 5V power adapter to power supply in
4. Connect your phone set to stereo out(Green)
5. Connect your LCD module to LCD connector
6. Connect with PC by a USB cable
2.1.3 Hypterminal Setup

2.2 BIOS Function

2.2.1 Enter BIOS

Supervivi had been pre-loaded in Nor Flash before shipment. Set S2 to Nor Flash can enter BIOS main menu after power on:
About supervivi:

Supervivi is a bootloader based on Samsung open source vivi. It can be used as a tool to download and burn OS image to the flash on board. It can also be used to for parameters configuration.

Supervivi download OS image file from PC by USB port.

Supervivi can be installed in either Nor Flash or Nand Flash. When Supervivi is booting from Nand Flash, user can hold down space bar in Hypterminal when board booting, to force supervivi enter main menu. Or supervivi will directly boot OS image by default.

Supervivi also has a Download&Run feature which can run user image directly. There is a sample code 2440test on CD-ROM for this kind application.

2.2.2 Install USB Driver

DNW USB driver for windows is located on CD-ROM \windows tool\usb. Install this driver when board connected to PC first time. Open DNW, “usb:ok” will indicated on DNW title bar if USB connection successfully:

USB device list on PC after driver installation
2.2.3 Main Menu Function

Note: DNW is needed for all function related with image downloading through USB connection.

[x]: make default partition on Nand Flash  
[v]: download vivi image to vivi partition on Nand Flash  
[k]: download linux image to kernel partition on Nand Flash  
[y]: download yaffs file system image to root partition on Nand Flash  
[c]: download cramfs file system image to root partition on Nand Flash  
[a]: download user binary image to Nand Flash, like 2440test, uCos2, U-Boot  
[n]: download Nboot image to block0 on Nand Flash  
[e]: download Eboot to Eboot partition on Nand Flash  
[i]: download NK.nb0 to Nand Flash
[w]: download NK.bin to Nand Flash
[d]: download exec image to specific memory address(Address is defined by DNW|Configuration|Option) and run it. The SDRAM address is 0x30000000 – 0x34000000. The memory size is 64Mbytes. The user available address space is 0x30000000 – 0x33DE8000.
[z]: download zImage to 0x30008000
[g]: run zImage image in memory, work together with command [z]
[f]: erase Nand Flash. The available address space for Nand Flash is 0x0 – 0x40000000

<table>
<thead>
<tr>
<th>Partition</th>
<th>Start Address</th>
<th>End Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vivi partition(block0-13)</td>
<td>0x0</td>
<td>0x50000</td>
</tr>
<tr>
<td>Linux kernel partition(block14-93)</td>
<td>0x50000</td>
<td>0x250000</td>
</tr>
<tr>
<td>File system partition(block94-4095)</td>
<td>0x250000</td>
<td>0x4000000</td>
</tr>
<tr>
<td>Whole Chip</td>
<td>0x0</td>
<td>0x40000000</td>
</tr>
</tbody>
</table>

[p]: make partition on Nand Flash for linux. Refer to sub menu function for details
[b]: boot OS
[s]: set linux start up parameters
[t]: display TOC of wince image
[u]: backup the whole content in nand flash and upload it to pc by dnw tool
[r]: restore backup file to nand flash by dnw
[q]: go to regular command line interface for vivi

Type “menu” to return to main menu for supervivi
2.2.4 Partition Sub Menu Function

(1) View current partition
Type “v” to view current partition information. If Nand Flash is empty or new, default partition table will be displayed.

<table>
<thead>
<tr>
<th>Name</th>
<th>Offset</th>
<th>Size</th>
<th>Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>vivi</td>
<td>0x000000000</td>
<td>0x000200000</td>
<td>0</td>
</tr>
<tr>
<td>u-boot</td>
<td>0x000300000</td>
<td>0x000300000</td>
<td>0</td>
</tr>
<tr>
<td>proc</td>
<td>0x000400000</td>
<td>0x000100000</td>
<td>0</td>
</tr>
<tr>
<td>kernel</td>
<td>0x000500000</td>
<td>0x000200000</td>
<td>0</td>
</tr>
<tr>
<td>root</td>
<td>0x000500000</td>
<td>0x03da0000</td>
<td>0</td>
</tr>
</tbody>
</table>

(2) Delete partition
Input “d” to delete specific partition. Input “vivi” if you want to delete “vivi” partition:

(3) Write Partition

Input “w” to write partition table. Partition modification can only take effect by write command.
(4) Append Partition

Input “a” to append a new partition. Supervivi will prompt you with some informations for the new partition like : name, offset, size and flag.

(5) Reset partition table
Input “r” to reset partition table with supervivi default parameter. Remember use “w” command to make your reset operation take effect.

2.2.5 Linux Parameter Setup

(1) View Parameter

Input “v” to view current parameters

(2) Set Parameter
Input “s” to set parameter.

**How to set mach_type**

The default mach_type is 782. You can change this parameter if you compile your kernel with MACH_TYPE 867.

![Parameter Menu](image1)

**How to set linux command line**

Linux_cmd_line is a very often used parameter for kernel startup. Here is an example for how to change default tty terminal from serial 0 to serial 1:

View current parameters:

Linux_cmd_line: noinitrd root=/dev/mtdblock2 init=/linuxrc console=ttySAC0

Input “s”, and then input “linux_cmd_line”, input “return”, and then input:

“noinitrd root=/dev/mtdblock2 init=/linuxrc console=ttySAC1,115200”

![Parameter Menu](image2)

After parameter successfully saved, Linux will startup and logon from serial 1.
(3) Save Parameter
Input “w” to save parameters

(4) Recover Parameter
Input “r” to recover default kernel startup parameters

2.3 Test Program without OS

Test program 2440test can be used to test PWM beeper, RTC clock, AD converter, button, touch screen, LCD, infra, I2C bus, audio in, audio out, SD Card and CMOS Camera.

2.3.1 Download 2440test

Install USB driver on Windows and setup Windows Hyperterminal for serial cable connection. Connect USB cable and launch DNW for 2440test binary image downloading. The USB download address in DNW should be 0x30000000.
2440 test program will automatically run after successfully download:

2.3.2 Hardware Test

(1) Beeper Test
(2) RTC clock test

(3) AD converter test

User can skew W1 on board for this AD converter test.
(4) Button Test

(5) Touch Screen Test
(6) LCD Test

(8) I2C Test
(9) Stereo Out Test

Connect your external phone set or speaker to MINI2440 stereo out socket (Green)

(10) Audio In Test
(11) SD Card Test

Please select function:
0 : Please input 1-16 to select test
1 : Test PWR
2 : RTC time display
3 : Test ADC
4 : Test interrupt and key scan
5 : Test Touchpanel
6 : Test LCD MT9505YW-T04
7 : Test LCD TFT 640x480
8 : Test IIC EEPROM
9 : DDA2341 play music
10 : UDA1381 record voice
11 : Test SD Card
10
The frequency of record is 48KHz

err = 0
Added IOBUF buffer for record
Press any to Record
Now begin recording, Press 'ESC' to quit.

SDI Card Write and Read Test
Init. Frequency is 30120Khz
In Idle
MMC check end
In SD ready
end id
SD frequency is 250000000Hz
In Stand-by
End Rx Buffer flush
Black write test[ Polling write ]
Black read test[ Polling read ]
Check Rx datas

The rx_buffer is same to Rx_buffer!
SD CMD Write and Read test is OK?

Please select function:
(12) CMOS Camera Test

This function can only be tested when LCD screen connected.

2.4 Linux Function

Linux was pre-loaded as default OS before shipment. This default linux image is root_default.img on CD-ROM. With support by linux, user can test the functionalities of almost all of hardware resources on the board.

2.4.1 MP3 Play

Madplay is MP3 player under console. It has several play modes and the simplest way to use is:

```
#madplay your.mp3
```

Please run “madplay –h” for help of this program.

2.4.2 Stop a Program

Press “Ctrl+c” to stop running of a program. Use “kill” to stop a program running on back ground.

2.4.3 Use U-Disk and Mobile Harddisk

Mobile storage device file is /dev/scsi/host1/bus0/target0/lun0/part*. We create a link here in order to make compatible with standard linux U-Disk device name:
#ln –s /dev/scsi/host1/bus0/target0/lun0/part1/dev/sda1

Note: This command had been already in /etc/init.d/reS script. So user can use /dev/sda1 directly after system power up. Use the mount command as soon as a U-Disk plug in USB Host interface:

#mount /dev/sda1 /mnt

User can also mount U-Disk device directly after plugging in:

2.4.4 Use SD Card

Mounting of SD Card device is similar with U-Disk.
2.4.5 Use USB Camera

MINI2440 can support USB camera with vimicro chipset. As soon as USB camera plug in, the following device will automatically be installed:

```
[rooot@FriendlyARM /]# ls /dev/video*
/video0
[rooot@FriendlyARM /]# ls /dev/video*/v4l
/video0/v4l
```

Use spcacat to capture the picture:

```
# spcacat –p 100ms –N 5
```

For a better quality of picture:

```
# spcacat –s 384x288 –p 100ms –N 2 -o
```

2.4.6 Transfer file with PC

User can transfer(sz/rz) files with PC when he/she login linux by serial console.

2.4.7 Remotely display USB Camera

MINI2440 has an embedded web server:

```
http://192.168.1.230
```

There is a remote USB camera control and play function embedded in the main page.
2.4.8 LED Control

(1) LED Server

There is a automatically startup script(/etc/rc.d/init.d/leds) after system power on. This script call a server program named as led-player. Led-player will create pipe file at /tmp, so user can change flash ratio of the leds by sending different parameters to the piple.

```
# echo 0 0.2 > /tmp/led-control
4 leds will flash as a flow with 0.2 seconds interval
# echo 1 0.2 > /tmp/led-control
4 leds will flash as a accumulating with 0.2 seconds interval
#/etc/rc.d/init.d/leds stop
4 leds will stop flashing
```
# /etc/rc.d/init.d/leds  
  start
  4 leds will start to flash

(2) Separately control of LED
/bin/leds is a separately controller of leds. User need to stop led-player before leds
#/etc/rc.d/init.d/leds  stop

[root@fa ]# led
  Usage: leds led_no 0|1
  Led_no is number of leds(0-3), 0 represent off, 1 represent on

### 2.4.9 Button Test

Run “buttons” to test buttons on board

### 2.4.10 Serial 2 and 3 Test

User need an expand board for serial port 2 and serial port 3 test. Set Hypterminal on PC to 115200 Baudrate and no hardware flow control.

  #armcomtest –d /dev/ttyS/1 –o
  #armcomtest –d dev/ttyS/2 –o

Result screen from serial port 2 or serial port 3:
2.4.11 Beeper test

Source code location:
Kernel-2.6.13/drivers/char/qq2440_pwm.c

2.4.12 LCD Backlight

Source code location:
Kernel-2.6.13/drivers/char/mini2440_backlight.c

[root@FriendlyARM/]#bl 0
Close LCD backlight
[root@FriendlyARM/]# bl 1
Open LCD backlight
[root@FriendlyARM/]#

2.4.13 I2C Test

Source code location:
Kernel-2.6.13/drivers/i2c/busses/i2c-s3c2410.c
2.4.14 Telnet

User can telnet to MINI2440 board by root without password.

2.4.15 Telnetd

User can telnet to MINI2440 board by root without password.
2.4.16 How to modify MAC address

```
# ifconfig
# ifconfig eth0 down
# ifconfig eth0 hw ether 00:11:AA:BB:CC:DD
# ifconfig eth0 up
# ifconfig
```

Change MAC address in startup script:
2.4.17 Ftpd
2.4.18 Remote LED control

Stop web server:
```bash
#/etc/rc.d/init.d/httpd stop
```

Start web server:
```bash
#/etc/rc.d/init.d/httpd start
```

2.4.19 NFS

Assume NFS server is started on 192.168.1.111:
```bash
#mount -t nfs -o nolock 192.168.1.111:/opt/FriendlyARM/QQ2440V3/root_nfs /mnt
```

Unmount command:
```bash
#umount /mnt
```
2.4.20 RTC Setup

Use hwclock command to connect linux clock with MINI2440 hardware RTC chip:
(1) date –s 042916352007
(2) hwclock –w
(3) hwclock –s #this command had been put into /etc/init.d/rcS script for automatically run after power on.

2.4.21 Non-valitaile Data in Flash

Yaffs file system will not lost any data in case system power failure.

2.4.22 Automatic Script When Power Up

Please check with /etc/init.d/rcS

2.4.23 How to do Screen Shoot

#snapshot   pic.png
2.5 Windows CE Function

2.5.1 USB Keyboard Simulation

Source code location:
SMDK2440\DRIVERS\Userkey

This feature had been compiled in wince kernel by default, so it is available as soon as wince startup:
K1 - TAB
K2 - UP
K3 - ENTER
K4 - DOWN
K5 - LEFT
K6 - RIGHT
Enter “K3” to open “My Device”

2.5.2 LED Test

Double click on “QQ2440 test” to open LED test program
2.5.3 Screen Rotation

Source code location:
SMDK2440\DRIVERS\DISPLAY
2.5.4 COM Debugger

2.5.5 Use U-Disk
2.5.6 Use SD/MMC Card
2.5.7 Use Windows Media Player

2.5.8 Use Super Player
2.5.9 Ethernet Test

2.5.10 Telnet

A telnet server is configured in WinCE. The default IP address of Wince is 192.168.1.217. No password needed for telnet logon.
2.5.11 Ftp

A ftp server is configured in WinCE. The default IP address of Wince is 192.168.1.217. Account/password is ftp/ftp
2.5.12 Web Server

The Windows CE Web Server is enabled on this device.

This file is a placeholder and should be replaced. Please see your Platform Builder docs or our website at http://msdn.microsoft.com/embedded.


2.5.13 Touch Screen Calibration

If the device does not respond correctly to clicks, you may need to re-calibrate the screen.
将指针轻而准确地点击在十字光标中心点一下，
当目标在屏幕上移动时，重复该动作。
按 Esc 离步骤。

新的设置已保存。
按 Enter 键继续新设置。
按 Esc 保持原有设置。

[Windows XP 操作系统界面图]
2.5.14 ActiveSync with PC

![ActiveSync Image]

2.5.15 Wireless Lan Card Test

A wireless lan card driver is integrated in Wince(VNUWLC41).

![Wireless Lan Card Test Image]
2.6 Install BIOS by SJF2440

SJF2440 is a tool from Samsung to burn flash on development board. It can support K9F1208 Nand Flash, AMD29LV800BB Nor Flash, etc.

Note: We suggest to do these operations on a PC with intel chipset mother board. Sometime JTAG board with parallel port will fail on the mother board with chipset from other vendors.

2.6.1 Install GIVEIO Driver

2.6.2 Burn BIOS

Note: The development board had been pre-loaded BIOS before shipment. We suggest you do not try the procedures in this section if you are not familiar with S3C2440 and low level details of the board.

First of all, connect JTag board to MINI2440 jtag port and connect other end of JTag board to your PC parallel port with GIVEIO driver already installed.

(1) Copy the folder \windows tools\SJF2440 on CD-ROM to PC. Double click on SJF2440_supervivi.bat to start. Select function “2” and then select Nor Flash(AM29LV160) to start burn.
(3) With prompt of “Available Target offset”, input offset “0”, start to burn. Select “2” after burn success.
3. OS Installation

Note:
To avoid Windows “blue screen failure” during USB downloading:
1. Do not plug in USB cable before target board power on
2. Do not plug in USB cable when reset target board
3. Plug in USB cable after supervivi main menu appears
4. Plug out USB cable after programming success
5. Current Linux kernel does not support USB device
6. Plug in USB cable after wince startup

3.1 Backup and Restore System

Backup content in Nand Flash
Restore NAND Flash

**Hand Flash**

- Status
  - Backup NAND Flash to File
  - Size: 64MB
  - erase size: 16KB
  - sloc: 512
  - sblock: 16
  - sctype: 0x2
  - secsize: 256

- Backup Information:
  - Start Addr: 0x0
  - End Addr: 0xA899999
  - block: 1
  - check block: 1
  - dwBackupTolen: 0x8200000
  - dwReservedBiks: 20
  - dwEPlmHkSize: 32

- dsm.exe read data 65536 bytes a time, has to read 1856 times

----------

USB Backup End
3.2 Install Linux

Linux binary image file is in image/linux folder. Connect MINI2440 board with USB cable and power on the board to enter supervivi main menu. Watch indicator on DNW title bar to check if USB connection success:

Major steps for linux installation:
(1) format Nand Flash(make partition)
(2) Install bootloader
(3) Install kernel
(4) Install file system
3.2.1 Nand Flash Make Partition

Caution: The operations in section 3.2.1 will erase all data in Nand Flash. Please do not shut off the power or you will have to re-load supervivi in Nand Flash.

3.2.2 BIOS Recovery
And then click USB Port->Transmit to download supervivi image file.

After successfully downloading, BIOS will update this new supervivi image to Nand Flash.
3.2.3 Install Kernel

Click DNW USB Port->Transmit to select which kernel image file you want to download. Linux kernel image will be updated to Nand Flash after successfully downloading.
3.2.4 Install yaffs

Click DNW USB Port->Transmit to select which file system image file you want to download. Linux file system image will be updated to Nand Flash after successfully downloading.
3.2.5 Start OS

Please un-plug USB cable after system successfully updated
Input [b] under BIOS or power cycle/reset the board. Supervivi will restart and boot linux automatically.

3.3 Install Wince

Wince binary image file is on image/wince folder. Connect MINI2440 board with USB cable and power on the board to enter supervivi main menu. Watch indicator on DNW title bar to check if USB connection success:

![USB Connection Indicator](image)

Major steps for Wince installation:
(1) format Nand Flash(make partition)
(2) Install bootloader
(3) Install Eboot
(4) Install Wince

3.3.1 Nand Flash Make Partition

![Nand Flash Make Partition GUI](image)
3.3.2 BIOS Recovery

Caution: The operations in section 3.3.1 will erase all data in Nand Flash. Please do not shut off the power or you will have to re-load supervivi in Nand Flash.

And then click USB Port->Transmit to download supervivi image file.
After successfully downloading, BIOS will update this new supervivi image to Nand Flash.

3.3.3 Install EBoot
3.3.4 Install Kernel

Eboot will prompt user to download wince from USB. Click USB Port->Transmit to select Wince image file to start download.
Eboot will low level format Nand Flash and then convert BinFS. After formatting successfully done, Eboot will update windows CE image file to Nand Flash. WinCE will automatically start up finally.
Appendix: OS Installation by Command Line

Note: We recommend you use supervivi main menu to update software but we still list command line commands here for your reference.

1. How to enter command line mode

Supervivi will enter main menu when board is set to Nor Flash boot mode. Select function [q] to enter command line mode

1.1 From BIOS main menu

User can also enter supervivi command line interface when board is booting from Nand Flash. Connect the board with PC by serial cable and USB cable. Open Windows hypterminal and DNW. Hold on space bar in Hypterminal. Power on MINI2440 and then you can enter command line interface:

```
#### FriendlyARM BIOS for 2440 ####
[X] boot part 0 32k 2368k
[Y] Download vivi
[Z] Download linux kernel
[Y] Download root_raffs image
[X] Download root_izmasf image
[X] Download nboot
[X] Download Eboot
[1] Download UnlCE NKB
[0] Download UnlCE NKB.bin
[D] Download & Run
[F] Format the nand flash
[P] Partition for Linux
[B] Boot the system
[S] Set the boot parameters
[c] Print the TID struct of wince
[q] Seto shell of vivi
Enter your selection: _
```
2. Linux Installation

Linux binary image file is on image/linux folder. Connect MINI2440 board with USB cable and power on the board to enter supervivi command line mode. Watch indicator on DNW title bar to check if USB connection success:

![Image of supervivi command line]

Major steps for linux installation:
(1) format Nand Flash(make partition)
(2) Install bootloader
(3) Install kernel
(4) Install file system

2.1 Nand Flash Make Partition

Under BIOS: **bon part 0 320k 2368k**

Description: bon is command to make partition, the command above is to make 3 partition from Nand Flash address 0:

0-320k: size is 320k
320k-2368k: size is 2M
2368k-64M: size is 62M
2.2 BIOS Recovery

Caution: The operations in section 2.1 will erase all data in Nand Flash. Please do not shut off the power or you will have to re-load supervivi in Nand Flash.

Input: `load flash vivi u`
And then click USB Port->Transmit to download supervivi image file.

After successfully downloading, BIOS will update this new supervivi image to Nand Flash.
Note: User can also use **load flash vivi x** command to download and update suervivi by xmodem prototype from hypterminal.

### 2.3 Install Linux

**Input:** **load flash kernel u**

Click DNW USB Port->Transmit to select which kernel image file you want to download. Linux kernel image will be updated to Nand Flash after successfully downloading.
Note: User can also use `load flash kernel x` command to download and update linux kernel by xmodem prototype from hypterminal.

2.4 Install yaffs

Input: loadyaffs root u

Click DNW USB Port->Transmit to select which file system image file you want to download. Linux file system image will be updated to Nand Flash after successfully downloading.
2.5 Start OS

Please un-plug USB cable after system successfully updated
Input “boot” under BIOS or power cycle/reset the board. Supervivi will restart and boot linux automatically.

3. Wince Installation

Wince binary image file is on image/wince folder. Connect MINI2440 board with USB cable and power on the board to enter supervivi command line mode. Watch indicator on DNW title bar to check if USB connection success:

Major steps for Wince installation:
(1) format Nand Flash(make partition)
(2) Install bootloader
(3) Install Eboot
(4) Install Wince

3.1 Nand Flash Make Partition

Under BIOS: bon part 0 320k 2368k
Description: bon is command to make partition, the command above is to make 3 partition from Nand Flash address 0:
0-320k: size is 320k
320k-2368k: size is 2M
2368k-64M: size is 62M

3.2 BIOS Recovery

Caution: The operations in section 3.1 will erase all data in Nand Flash. Please do not shut off the power or you will have to re-load supervivi in Nand Flash.

Input: `load flash vivi u`
And then click USB Port->Transmit to download supervivi image file.

After successfully downloading, BIOS will update this new supervivi image to Nand Flash.
Note: User can also use **load flash vivi x** command to download and update suervivi by xmodem prototype from hypterterminal.

### 3.3 Install EBoot

**Input:** **load flash eboot u**

Click USB Port->Transmit to select eboot.nb0 to start download. Eboot will be automatically updated to Nand Flash after successfully downloading.

Note: User can also use **load flash eboot x** command to download eboot from hypterterminal by xmodem prototype.
3.4 Install Kernel

Input: `load flash wince u`

Eboot will prompt user to download wince from USB. Click USB Port->Transmit to select Wince image file to start download.

Eboot will low level format Nand Flash and then convert BinFS. After formatting successfully done,
Eboot will update windows CE image file to Nand Flash. WinCE will automatically start up finally.