



Tiny6410 Development Kit

- **ARM11 Samsung S3C6410, ARM1176JZF-S, up to 533MHz**
- **256MByte DDR RAM + 256GByte NAND Flash**
- **TV-out, GPS, GPRS, WIFI and Camera module support**
- **Supports Linux2.6 Android 2.1 and WinCE 6.0**



Overview

The Tiny6410 Development Kit is a high-performance controller board introduced. It is designed based on the S3C6410 microcontroller, 256MByte DDR SDRAM, 1GByte Nand Flash, RTC, Audio and net on board. It has integrated RS232, USB, Ethernet, Audio In/Out, Keyboard, LCD, CVBS, TV out, camera in, SD card and more other functions on board. So many hardware resources provided by the expansion board, it becomes a solid reference board for customer design.

We also offers a complete software development package to customers. The board supports linux 2.6.3, Android2.3 and WindowsCE 6.0 operating system and is provided with complete basic drivers which enable a quick channel to evaluate the Samsung S3C6410 processor and customize application software. It would be an ideal development platform for multimedia and communication applications.

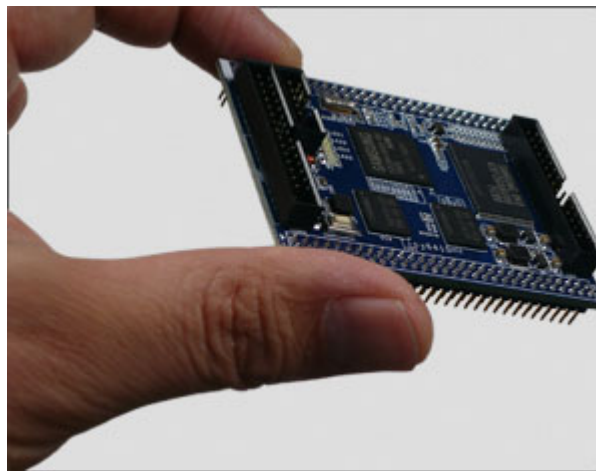


Hardware Features

The S3C6410X is a 16/32-bit RISC microprocessor, which is designed to provide a cost-effective, low-power capabilities, high performance Application Processor solution for mobile phones and general applications. To provide optimized H/W performance for the 2.5G & 3G communication services, the S3C6410X adopts 64/32-bit internal bus architecture. It also includes many powerful hardware accelerators for tasks such as motion video processing, audio processing, 2D graphics, display manipulation and scaling. An integrated Multi Format Codec (MFC) supports encoding and decoding of MPEG4/H.263/H.264 and decoding of VC1.

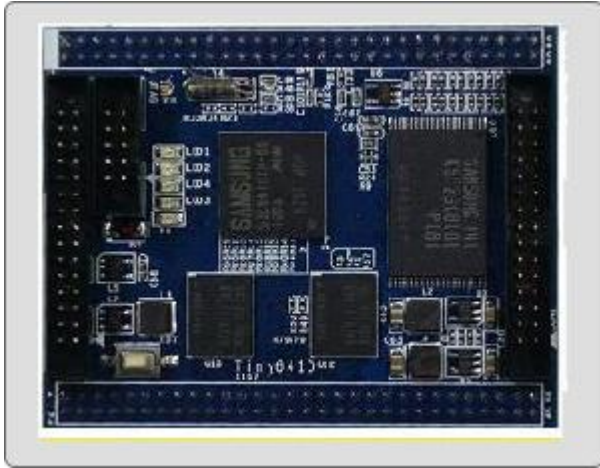
The Tiny6410 Single Board Computer is based on S3C6410 processor. This board is characterized as follows:

CPU board - Tiny6410 CPU board

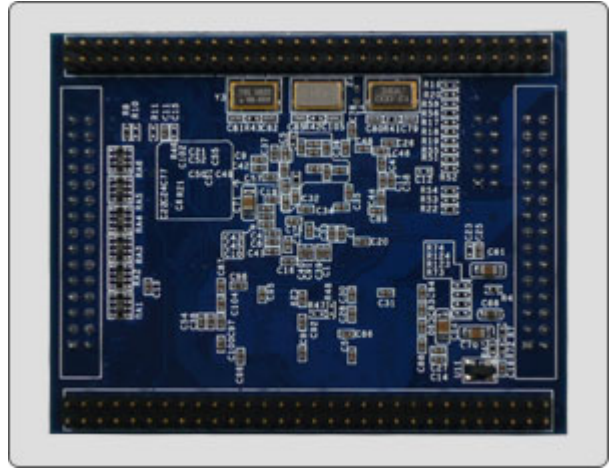


• **Feature of the Tiny6410 CPU board**

Item	Description
CPU	<ul style="list-style-type: none">• Samsung S3C6410A, run at 533Mhz ARM1176JZF-S, up to 667Mhz
RAM	<ul style="list-style-type: none">• 256 DDR RAM
Flash	<ul style="list-style-type: none">• 256 MB DDR RAM, 32 bit Bus
Interface	<ul style="list-style-type: none">• 4 x User Leds• 10 pin 2.0mm space Jtag connector• Reset button on board
Connector	<ul style="list-style-type: none">• 2 x 60 pin 2.0mm space DIP connector• 2 x 30 pin 2.0mm space GPIO connector
Power Supply	<ul style="list-style-type: none">• Supply Voltage from 2.0V to 6V
Size	<ul style="list-style-type: none">• 64 x 50 x 12mm (L x W x H)
OS Support	<ul style="list-style-type: none">• Windows CE 6• Linux 2.6.38• Android 2.3• Ubuntu 9.10



Tiny6410 Front view

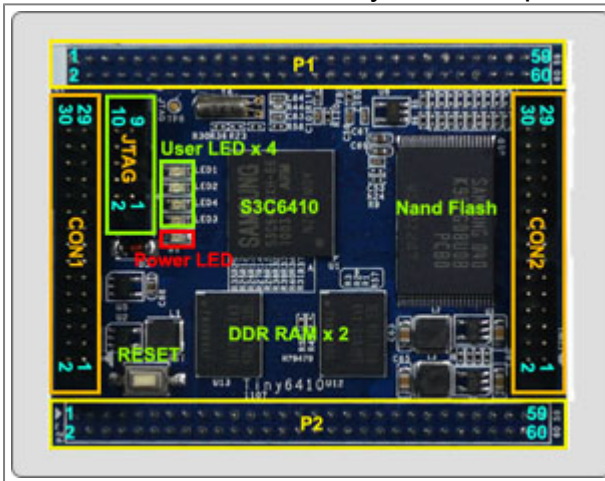


Tiny6410 Bottom view

• Pin definition of the Tiny6410 CPU board

Tiny6410 use the 2.0mm pitch double pin, leads to a total of 4 groups: P1, P2, CON1, CON2.

P1 and P2 are each 60 Pin; CON1 and CON2 are each 30Pin, leads to a total of 180 Pin. The follow shown is the layout description:



Pin	Details
P1	Contain LCD, AD, SDIO2, EINT, USB, TVOUT0
P2	Serial port, SPI1, I2C, SD Card, AC97(I2S), System bus
CON1	GPIO , AD , SPI0 , TAVOUT1
CON2	CMOS , GPIO
JTAG	JTAG interface
Others	4 User LED, power LED, Reset key.

P1	Pin define	Remarks	P1	Pin define	Remarks
P1.1	VDD_5V	DC 5V input	P1.2	GND	GND
P1.3	VD23	LCD_R5/GPJ7	P1.4	VD22	LCD_R4/GPJ6
P1.5	VD21	LCD_R3/GPJ5	P1.6	VD20	LCD_R2/GPJ4
P1.7	VD19	LCD_R1/GPJ3	P1.8	VD18	LCD_R0/GPJ2
P1.9	VD15	LCD_G5/GPI15	P1.10	VD14	LCD_G4/GPI14
P1.11	VD13	LCD_G3/GPI13	P1.12	VD12	LCD_G2/GPI12
P1.13	VD11	LCD_G1/GPI11	P1.14	VD10	LCD_G0/GPI10
P1.15	VD7	LCD_B5/GPI7	P1.16	VD6	LCD_B4/GPI6
P1.17	VD5	LCD_B3/GPI5	P1.18	VD4	LCD_B2/GPI4
P1.19	VD3	LCD_B1/GPI3	P1.20	VD2	LCD_B0/GPI2
P1.21	VDEN	VDEN/GPJ10	P1.22	PWM1	PWM1/GPF15



P1.23	VSYNC	LCD Column signal/GPJ9	P1.24	HSYNC	LCD row signal/GPJ8
P1.25	VCLK	LCD clock /GPJ11	P1.26	GPE0	GPE0
P1.27	VBUS	VBUS	P1.28	OTGDRV_VBUS	OTGDRV_VBUS
P1.29	OTGID	OTGID	P1.30	XEINT8	EINT8/GPN8
P1.31	OTGDM	USB Slave D-	P1.32	USBDN	USB Host D-
P1.33	OTGDP	USB Slave D+	P1.34	USBDP	USB Host D+
P1.35	TSXP	TSXP/AIN7	P1.36	TSXM	TSXM/AIN6
P1.37	TSYP	TSYP/AIN5	P1.38	TSYM	TSYM/AIN4
P1.39	AIN0	AIN0	P1.40	AIN1	AIN1
P1.41	WiFi_IO	WiFi_IO/GPP10	P1.42	WiFi_PD	WiFi_PD/GPP11
P1.43	SD1_CLK	SD1_CLK/GPH0	P1.44	SD1_CMD	SD1_CMD/GPH1
P1.45	SD1_nCD	SD1_nCD/GPN10	P1.46	SD1_nWP	SD1_nWP/GPL14
P1.47	SD_DAT0	SD1_DAT0/GPH2	P1.48	SD1_DAT1	SD1_DAT1/GPH3
P1.49	SD1_DAT2	SD1_DAT2/GPH4	P1.50	SD1_DAT3	SD1_DAT3/GPH5
P1.51	DACOUT0	TV -OUT	P1.52	PWM0	PWM0/GPF14
P1.53	XEINT0	XEINT0/GPN0	P1.54	XEINT1	XEINT1/GPN1
P1.55	XEINT2	XEINT2/GPN2	P1.56	XEINT3	XEINT3/GPN3
P1.57	XEINT4	XEINT4/GPN4	P1.58	XEINT5	XEINT5/GPN5
P1.59	XEINT19	XEINT19/GPL11	P1.60	XEINT20	XEINT20/GPL12

P2	Pin define	Remarks	P2	Pin define	Remarks
P2.1	OM3	SD/NAND boot set	P2.2	OM4	SD/NAND boot set
P2.3	M_nRESET	Reset signal	P2.4	VDD_RTC	RTC battle
P2.5	RTSn1	RTSn1/GPA7	P2.6	CTSn1	CTSn1/GPA6
P2.7	TXD0	TXD0/GPA1	P2.8	RXD0	RXD0/GPA0
P2.9	TXD1	TXD1/GPA5	P2.10	RXD1	RXD1/GPA4
P2.11	TXD2	TXD2/GPB1	P2.12	RXD2	RXD2/GPB0
P2.13	TXD3	TXD3/GPB3	P2.14	RXD3	RXD3/GPB2
P2.15	SPIMOSI	SPIMOSI/GPC6	P2.16	SPIMISO	SPIMISO/GPC4
P2.17	SPICLK	SPICLK/GPC5	P2.18	SPICS	SPICS/GPC7
P2.19	I2CSCL	I2CSCL/GPB5	P2.20	I2CSDA	I2CSDA/GPB6
P2.21	SD0_CLK	SD0_CLK/GPG0	P2.22	SD0_CMD	SD0_CMD/GPG1
P2.23	SD0_nCD	SD0_nCD/GPG6	P2.24	SD0_nWP	SD0_nWP/GPL13
P2.25	SD0_DAT0	SD0_DAT0/GPG2	P2.26	SD0_DAT1	SD0_DAT1/GPG3
P2.27	SD0_DAT2	SD0_DAT2/GPG4	P2.28	SD0_DAT3	SD0_DAT3/GPG5
P2.29	AC97_BITCLK	AC97_BITCLK/GPD0	P2.30	AC97_RSTn	AC97_RSTn/GPD1
P2.31	AC97_SYNC	AC97_SYNC/GPD2	P2.32	AC97_SDO	AC97_SDO/GPD4
P2.33	AC97_SDI	AC97_SDI/GPD3	P2.34	XEINT12	XEINT12/GPN12
P2.35	ADDR0	ADDR0	P2.36	ADDR1	ADDR1
P2.37	ADDR2	ADDR2	P2.38	ADDR3	ADDR3



P2.39	nCS1	nCS1	P2.40	XEINT7	XEINT7/GPN7
P2.41	nWAIT	nWAIT	P2.42	nESET	Reset Signal(Output)
P2.43	LnWE	LnWE	P2.44	LnOE	LnOE
P2.45	DATA0	DATA0	P2.46	DATA1	DATA1
P2.47	DATA2	DATA2	P2.48	DATA3	DATA3
P2.49	DATA4	DATA4	P2.50	DATA5	DATA5
P2.51	DATA6	DATA6	P2.52	DATA7	DATA7
P2.53	DATA8	DATA8	P2.54	DATA9	DATA9
P2.55	DATA10	DATA10	P2.56	DATA11	DATA11
P2.57	DATA12	DATA12	P2.58	DATA13	DATA13
P2.59	DATA14	DATA14	P2.60	DATA15	DATA15

CON1	Pin define	Remarks	CON1	Pin define	Remarks
CON1.1	VDD_IO(3.3V)	OUT	CON1.2	GND	
CON1.3	GPE1		CON1.4	GPE2	
CON1.5	GPE3		CON1.6	GPE4	
CON1.7	GPM0		CON1.8	GPM1	
CON1.9	GPM2		CON1.10	GPM3	
CON1.11	GPM4		CON1.12	GPM5	
CON1.13	GPQ1		CON1.14	GPQ2	
CON1.15	GPQ3		CON1.16	GPQ4	
CON1.17	GPQ5		CON1.18	GPQ6	
CON1.19	SPICLK0		CON1.20	SPIMISO0	
CON1.21	SPICS0		CON1.22	SPIMOSI0	
CON1.23	EINT6		CON1.24	EINT9	
CON1.25	EINT11		CON1.26	EINT16	
CON1.27	EINT17		CON1.28	AIN2	
CON1.29	AIN3		CON1.30	DACOUT1	

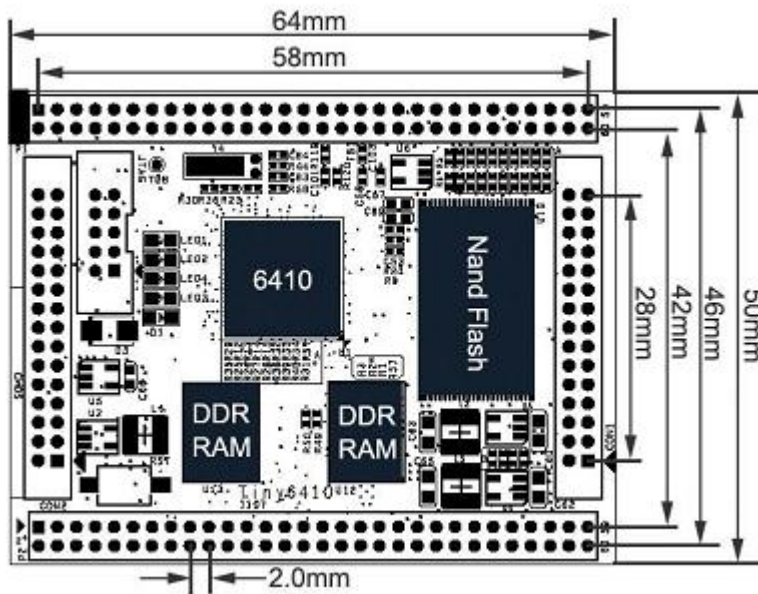
CON2	Pin define	Remarks	CON2	Pin define	Remarks
CON2.1	CAMSDA	link I2CSDA	CON2.2	CAMSCL	
CON2.3	GPK2		CON2.4	CAMRSTn	
CON2.5	CAMCLK		CON2.6	CAMHREF	
CON2.7	CAMVSYNC		CON2.8	CAMPCLK	
CON2.9	CAMDATA7		CON2.10	CAMDATA6	
CON2.11	CAMDATA5		CON2.12	CAMDATA4	
CON2.13	CAMDATA3		CON2.14	CAMDATA2	
CON2.15	CAMDATA1		CON2.16	CAMDATA0	
CON2.17	VDD_IO(3.3V)	OUT	CON2.18	VDDCAM	2.4-2.8V for CMOS
CON2.19	1.8V	for CMOS	CON2.20	GND	



CON2.21	GPK8		CON2.22	GPK12	
CON2.23	GPK13		CON2.24	EINT18	
CON2.25	VD0	For LCD	CON2.26	VD1	For LCD
CON2.27	VD8	For LCD	CON2.28	VD9	For LCD
CON2.29	VD16	For LCD	CON2.30	VD17	For LCD

JTAG	Pin define	Remarks	JTAG	Pin define	Remarks
1	VDD_IO	Power input 3.3V	2	VDD_IO	Power input 3.3V
3	TRSTn	TRSTn	4	nRESET	nRESET
5	TDI	TDI	6	TDO	TDO
7	TMS	TMS	8	GND	GND
9	TCK	TCK	10	GND	GND

• **Dimensions of the Tiny6410 CPU board**



Mother board - Tiny6410-SDK

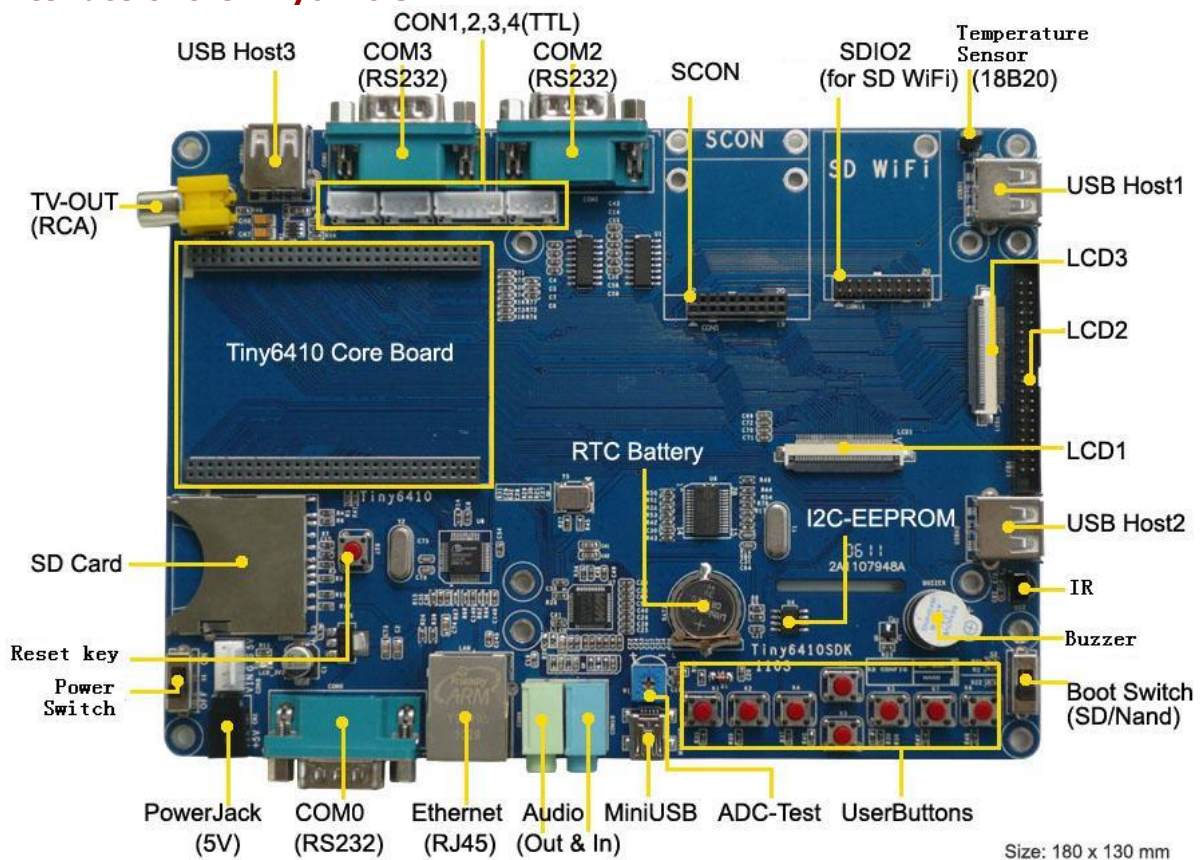
• **Feature of the Tiny6410 SDK board**

Item	Description
CPU	Samsung S3C6410A(ARM1176JZF-S)
Frequency	Operating frequency 533Mhz, up to 667Mhz
RAM	256 MB DDR RAM
Nand Flash	256MB Nand Flash
Multimedia	Support for Mpeg4, H.264, H.263, VC1 hardware decoding, up to 30fps @ SD
3D	3D hardware acceleration support
2D	Promise to support graphics scaling, rotation, flip
Debug Port	COM0 + JTAG + USB Slave
Indicator	4 x User LED (in the core board), 1 x Power LED



Test button	8 x User Buttons, interrupt-style buttons
USB Slave	1 x mini USB (OTG floor is not designed to function)
USB Host	Through the USB HUB chip, to achieve 4 USB Host
Network Interface	10/100M MB Ethernet, RJ-45 interfaces
Audio I/O	Standard two-channel audio input 3.5mm input and output ports
SD Card	Normal SD card connector
Serial	3 x RS232 DB9 serial port, 4 x TTL-level serial port Block
TV-OUT	1 x RCA output
SDIO2 Interface	Mainly used to access SD WiFi module (also includes SPI, I2C interface)
LCD Interface	3 LCD Interface Block leads (0.5mm pitch SMT, including seats, seat pin and 2.0mm pitch)
Buzzer	1 x PWM control the buzzer output
IR	1 channel infrared receiver
Temperature Sensor	1 Road DS18B02 Temperature Sensor
ADC conversion	An adjustable resistor, connected CPU's AD0 channel
RTC clock	On-board battery backup RTC clock
Power Supply	5V
PCB size	180 x 130 mm

Interface Of the Tiny6410 SDK





Software

WinCE 6.0

Boot loader

- Version: Stepldr and EBOOT(provide Source code)
- Function: support download and update system by SD and USB support uplate the boot logo
- Qucik boot: for 15s booting

WinCE NK

- Version : Wince6.0 R3
- Function: HIVE register support, BINFS support, 256M memory manage, SLEEP

Device Drivers

- TFT LCD/Touchscreen(support 3.5"LCD, 4.3"LCD, 7.0"LCD, 8"LCD, vGA)
- CMOS camera driver
- user key driver, PWM driver
- RTC driver
- DM9000 driver
- SD card support
- touch screen support
- audio In.Out
- USB host: usb disk, usb keyboard, usb mouse
- serial driver
- media support(JPEG, fimc, MFC, 2D/3D,TVENC, TVSCALER)
- **WIFI, Camera, TV-Out**
- **VGA driver(can support 1024 * 768),**
- **USB bluetooth, USB WiFi**
- IE6 explorer.

Test program

- LED test, button test, serial debug tools, PWM test, TV test, OpenGL test
- COMS camera test, SD wifi test, USB wifi test, backlight control test, usb bluetooth test, NET test.

Linux 2.6.36

Boot loader

- verison: s3c-u-boot-1.6.1
- Function: support boot and update system by SD card and USB

Linux kernel

- verison: s3c-Linux-2.6.38
- Compile: arm-none-linux -4.5.1-v6-vfp
- Function: support MFC, Jpeg encode, 2D/3D

Device Driver

- TFT LCD/Touchscreen(support 3.5"LCD, 4.3"LCD, 7.0"LCD, 8"LCD, VGA module)
- LCD backlight control
- 4 Serial port driver
- DM9000 net driver
- Audio driver(WM9714)
- RTC driver, User LED driver,
- USB HOST driver, USB camera, USB key and mouse, USB Disk.
- USB 3G module, USB WiFi
- SD card driver,
- IIC EEPROM
- Watchdog driver
- media play driver(JPEG, fimc, MFC, 2D/3D,TVENC, TVSCALER)
- CMOS Camera
- SPI driver



- **SDIO WIFI, GPRS**
- **USB module(bluetooth, WiFi, mouse, key)**

File System support

- ubifs/yaffs2/cramfs/fat32/NFS/Ext2/Ext3

Gui support

- qtopia-2.2.0
- QtE-4.4.3
- QtE-4.7.0

server program

- Busybox 1.13
- Telnet, FTP, Inetd
- boa(web server)
- madplay(play mp3)
- snapshot(capture program)
- ifconfig, ping, route(net command)

Test program

- ADC test, LED test, buttons test, I2C test
- LCD test, ping test, usb camera test
- recode test, web browse test
- watch dog test
- net config test
- LCD backlight control test
- lauguage test(support chinese, english)
- QT4 test
- SMplayer test
- 3G set
- GPRS Set
- USB camera test
- TV-out test
- SD WiFi, usb wifi test

NO.	Device	Driver position in linux	dev node in board	remarks
1	yaffs2	fs/yaffs2		use yaffs default
2	UBIFS	fs/ubifs		
3	EXT3	fs/ext3		
4	LCD	drivers/video/samsung/s3c_Tiny6410.c	/dev/fb0	The LCD driver
5	cmos camera	drivers/media/video/samsung/fimc/ov965x.c	/dev/camera	
6	USB camera	drivers/media/video/gspca	/dev/video0	
7	USB to serial	drivers/usb/serial/pl2302.c	/dev/ttyUSB0	
8	USB mouse, key	drivers/hid/usbhid	USB mouse: /dev/input/mice USBkey: /dev/input/event	
9	LED	drivers/char/Tiny6410_leds.c	/dev/leds	
10	Button	drivers/char/Tiny6410_buttons.c	/dev/buttons	
11	IIC-EEPROM	drivers/i2c	/dev/i2c/0	
12	PWM	drivers/char/mini2440_pwm.c	/dev/pwm	
13	ADC	no		
14	LCD backlight	drivers/video/Tiny6410_backlight.c	/dev/backlight	
15	watchdog	drivers/watchdog/s3c2410_wdt.c	/dev/watchdog	
16	Touchscreen	drivers/input/touchscreen/s3c-ts.c	/dev/input/event0	
17	u-disk	drivers/usb/storage	/dev/udisk	



18	SD card	drivers/mmc/core	/dev/sdcard	up to 32G
19	NAND Flash	drivers/mtd/nand	/dev/mtdblock2	
20	WM9714 audio	sound/soc/s3c64xx	/dev/dsp /dev/mixer	
21	RTC	drivers/rtc/rtc-s3c.c	/dev/rtc	
22	Serial	drivers/serial/s3c6400.c	/dev/ttySAC0,1,2,3	
23	USB WIFI	drivers/net/wireless/	wlan0	
24	DM9000 NET	drivers/net/dm9000.c	eth0	
25	TV-OUT	drivers/media/video/samsung/tv		
26	3D	drivers/media/video/samsung/g3d		
27	2D	drivers/media/video/samsung/g2d		
28	JPEG	drivers/media/video/samsung/jpeg		
29	rotator	drivers/media/video/samsung/rotator		
30	post	drivers/media/video/samsung/post		
31	MFC	drivers/media/video/samsung/mfc10		

Android 2.3

Boot loader

- verison: s3c-u-boot-1.1.6
- Function: support boot and update system by SD card and USB

Linux kernel

- verison: s3c-Linux-2.6.36
- Compile: jdk5

Device Driver

- TFT LCD/Touchscreen, Audio OUT, MMC/SD card, NET, Serial port
- watchdog, RTC, keyboard
- **WIFI, Camera, USB bluetooth, Net DHCP, usb disk, 3G**

File System support

- Ubi filesystem, yaffs, ext2/3,

Function use example

- **Ethernet, Support DHCP.**
- **SD WiFi support**
- **COMS Camera support**
- **3G support(WCDMA, CDMA2000, TD-CDMA)**
- **USB Disk support**
- **USB Bluetooth support**
- **Switch horizontal and vertical screen**
- **Dynamic Wallpapers**

Ubuntu 0910

Boot loader

- verison: s3c-u-boot-1.1.6
- Function: support boot and update system by SD card and USB

Linux kernel

- verison: s3c-Linux-2.6.28.6

Ubuntu rootfs

- Ubuntu 0910, EXT2/3, UBIFS



Order Information

Order No.	<ul style="list-style-type: none">• KIT07
Item	<ul style="list-style-type: none">• Tiny6410-SDK Single Board Computer
HardWare	<ul style="list-style-type: none">• One Tiny6410 Single Board Computer(Contain CPU board)• One 4.3"LCD• One Serial cable• One net cable• One Mini-USB cable• One 5V@2A Power adapter
Option Module	<ul style="list-style-type: none">• 7"LCD Module• GPRS Module• GPS Module• WIFI Module• Camera Module• 3G module(WCDMA, CDMA2000)• USB Bluetooth• VGA module
Software	<ul style="list-style-type: none">• Documents (user manual, Datasheet, Schematic)• Linux 2.6.38 BSP• Android 2.3 source code• WinCE BSP• Ubuntu
Price	<ul style="list-style-type: none">• Please contact us(www.armdevs.com)



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