Tiny210/Tiny210V2

User manual

V1.0

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فروشگاه تخصصی برق و الکترونیک
شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲

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Document version

Table 0-1   Document Revision Notes

Date	Description
2012.10	Add the Tiny210V2 board support
2011.12	Second version

Please check for a newer revision of this manual at CoreWind's web site:

http://armdevs.com/info194.html

Compare the revision notes of the updated manual from the web site to those of the printed or electronic version you have.

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شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲

1 INTRODUCTION

1.1 About This Document

This document is part of a set of reference documents providing information necessary to operate and use CoreWind's Tiny210.

1.2 Related Document

For additional information not covered in this manual, please refer to the documents listed in Table 1.1.

Table 1-1 Related Document

Document	Location
Tiny210 Test Method	http://armdevs.com/info194.html

فروشگاه تخصصی برق و الکترونیک
شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲

2 Tiny210/Tiny210V2 Hardware info
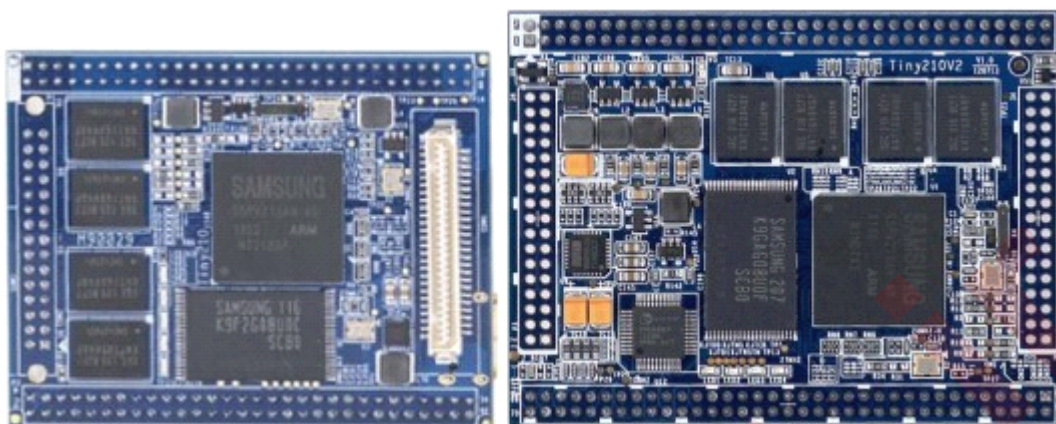
Tiny210 CPU board   **Tiny210V2 CPU board**

Tiny210 and Tiny210V2 CPU board is a high-performance Cortex- A8 core board. It uses Samsung S5PV210 as the main processor, running at up to 1GHz. Integrated PowerVR SGX540 S5PV210 internal high-performance graphics engine, support for 3D graphics run smoothly, and can be smooth to play 1080P video of the large size.

2.1 Tiny210 CPU board info

Tiny210 CPU board use the double-pin 2.0mm pitch, leads to the CPU the most common functional pin, and seeks to Tiny6410 core board three rows of pin-compatible (P1, P2, and the CON2); also features the S5PV210 chips, respectively, leads to the standard miniHDMI interface, and 1.0mm pitch SMD CON1 Block (51Pin), as shown above.

Tiny210 onboard 512M DDR2 memory and 256MB SLC Nand Flash(Support expand 1GB SLC Nand Flash), and can smoothly run advanced operating system, Android, Linux and WinCE6. It is ideal for the development of high-end Internet of Things, advertising, multimedia terminal, smart home, high-end surveillance system, video game control panel device.

2.1.1 Tiny210 CPU board Resouce
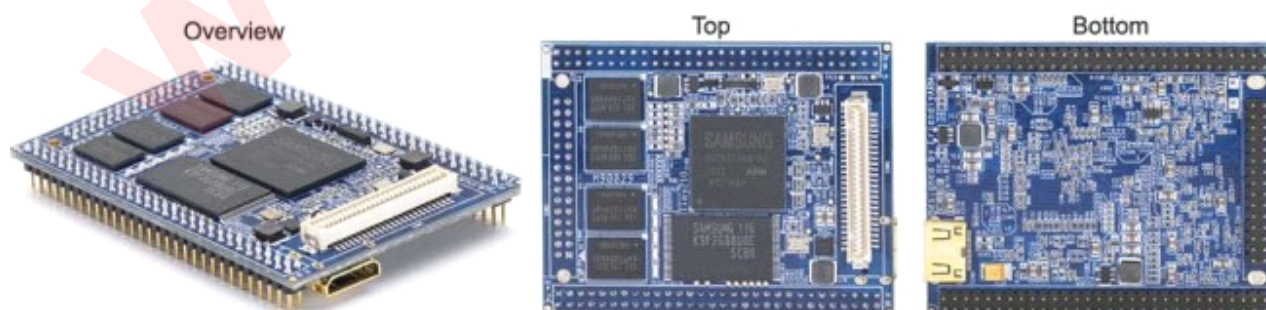
System

- CPU: 1 GHz Samsung S5PV210 with PowerVR SGX540 graphics engine

- DDR2 RAM: 512MB DDR2 RAM, 32bit data bus, 200MHz
- FLASH: SLC NAND Flash: 256MB/1GB

Multi-IO

- 2 x 60 Pin 2.0mm space DIP connector
- 1 x 51 Pin 1.0mm space SMD connector
- 1 x 30 Pin 2.0mm space DIP connector

on Board source

- HDMI interface
- 4 x User Leds(Green)
- 1 x Power Led(Red)
- Supply Voltage from 2V to 6V

Mechanical: Dimension: 64x 50x 11mm

Software: Android 4.0, Android 2.3, Linux 2.6.35, Qtopia-2.2.0/Qt-4.4.3/Qt-4.7

2.1.2 Tiny210 CPU board Pin Define
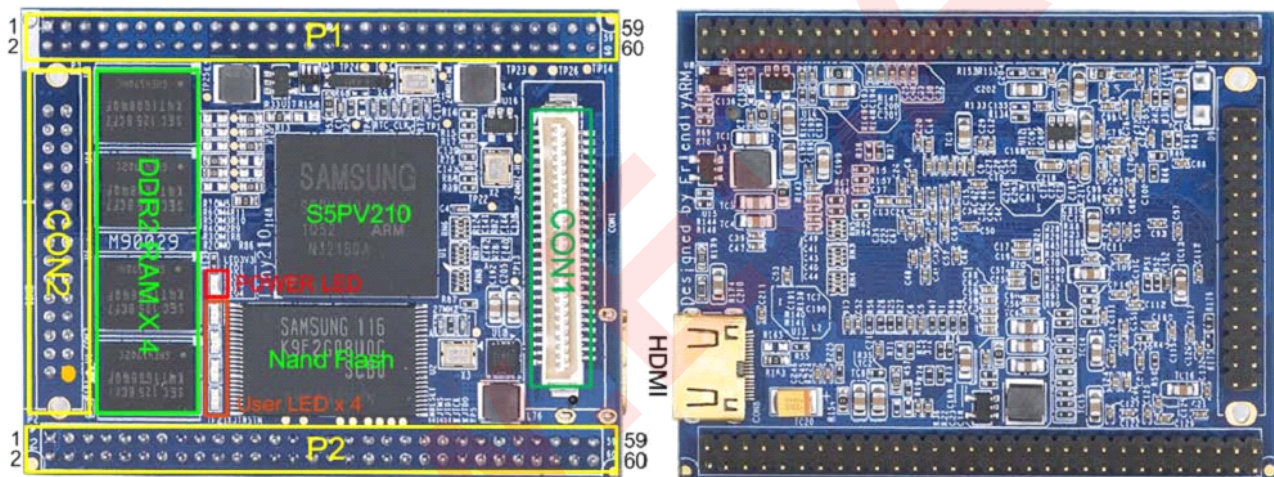
Pin define:

P1	Pin Define	P1	Pin Define
P1.1	VDD_5V	P1.2	DGND
P1.3	XvVD23	P1.4	XvVD22
P1.5	XvVD21	P1.6	XvVD20
P1.7	XvVD19	P1.8	XvVD18
P1.9	XvVD15	P1.10	XvVD14
P1.11	XvVD13	P1.12	XvVD12
P1.13	XvVD11	P1.14	XvVD10
P1.15	XvVD7	P1.16	XvVD6
P1.17	XvVD5	P1.18	XvVD4
P1.19	XvVD3	P1.20	XvVD2
P1.21	XvVDEN	P1.22	XEINT10
P1.23	XvVSYNC	P1.24	XvHSYNC
P1.25	XvVCLK	P1.26	XpwmTOUT1
P1.27	XuoVBUS	P1.28	XuoDRVVBUS
P1.29	XuoID	P1.30	XEINT8

P1.31	XuoDM	P1.32	XuhDM
P1.33	XuoDP	P1.34	XuhDP
P1.35	XadcAIN9_XP	P1.36	XadcAIN8_XM
P1.37	XadcAIN7_YP	P1.38	XadcAIN6_YM
P1.39	XadcAIN0	P1.40	XadcAIN1
P1.41	WIFI0_PD_GPIO	P1.42	WIFI0_RESET_GPIO
P1.43	Xmmc2CLK/SPI_CLK2	P1.44	Xmmc2CMD/SPI_CSn2
P1.45	Xmmc2CDn/SPI_MISO2	P1.46	XEINT11
P1.47	Xmmc2DATA0/SPI_MOSI2	P1.48	Xmmc2DATA1
P1.49	Xmmc2DATA2	P1.50	Xmmc2DATA3
P1.51	XdacOUT	P1.52	XpwmTOUT0
P1.53	XEINT16/KP_COL0	P1.54	XEINT17/KP_COL1
P1.55	XEINT18/KP_COL2	P1.56	XEINT19/KP_COL3
P1.57	XEINT24/KP_ROW0	P1.58	XEINT25/KP_ROW1
P1.59	XEINT26/KP_ROW2	P1.60	XEINT27/KP_ROW3
P2	**Pin Define**	**P2**	**Pin Define**
P2.1	OM1	P2.2	–
P2.3	M_nRESET	P2.4	OVDD_RTC_AP
P2.5	XuCTSn1	P2.6	XuRTSn1
P2.7	XuTXD0	P2.8	XuRXD0
P2.9	XuTXD1	P2.10	XuRXD1
P2.11	XuTXD2/UART_AUDIO_TXD	P2.12	XuRXD2/UART_AUDIO_RXD
P2.13	XuTXD3/RTSn2/UART_AUDIO_R	P2.14	XuRXD3/CTSn2/UART_AUDIO_CTSn
P2.15	XspiMISO1	P2.16	XspiMOSI1
P2.17	XspiCLK1	P2.18	XspiCS1
P2.19	Xi2cSCL0	P2.20	Xi2cSDA0
P2.21	XmmcCLK0	P2.22	XmmcCMD0
P2.23	Xmmc0CDn	P2.24	XEINT6_SD0_nWP
P2.25	Xmmc0DATA0	P2.26	Xmmc0DATA1
P2.27	Xmmc0DATA2	P2.28	Xmmc0DATA3
P2.29	Audio_Xi2sSCLK0	P2.30	Audio_Xi2sCDCLK0
P2.31	Audio_Xi2sLRCK0	P2.32	Audio_Xi2sSDO0_0
P2.33	Audio_Xi2sSDI0	P2.34	XEINT9
P2.35	Xm0ADDR0	P2.36	Xm0ADDR1
P2.37	Xm0ADDR2	P2.38	Xm0ADDR15
P2.39	Xm0CSn1	P2.40	XEINT7
P2.41	Xm0WAITn	P2.42	XnRSTOUT
P2.43	Xm0WEn	P2.44	Xm0OEn
P2.45	Xm0DATA0	P2.46	Xm0DATA1
P2.47	Xm0DATA2	P2.48	Xm0DATA3
P2.49	Xm0DATA4	P2.50	Xm0DATA5
P2.51	Xm0DATA6	P2.52	Xm0DATA7
P2.53	Xm0DATA8	P2.54	Xm0DATA9

P2.55	Xm0DATA10	P2.56	Xm0DATA11
P2.57	Xm0DATA12	P2.58	Xm0DATA13
P2.59	Xm0DATA14	P2.60	Xm0DATA15
CON1	**Pin Define**	**CON1**	**Pin Define**
CON1.1	VDD_5V	CON1.2	VDD_5V
CON1.3	XmmcCLK1	CON1.4	VDD_SYS_3.3V
CON1.5	XmmcCMD1	CON1.6	VDD_SYS_1.8V
CON1.7	XmmcCDn1	CON1.8	DGND
CON1.9	Xmmc1DATA0	CON1.10	CAM_B_D0
CON1.11	Xmmc1DATA1	CON1.12	CAM_B_D1
CON1.13	Xmmc1DATA2	CON1.14	CAM_B_D2
CON1.15	Xmmc1DATA3	CON1.16	CAM_B_D3
CON1.17	Xmmc3CLK	CON1.18	CAM_B_D4
CON1.19	Xmmc3CMD	CON1.20	CAM_B_D5
CON1.21	Xmmc3CDn	CON1.22	CAM_B_D6
CON1.23	Xmmc3DATA0/Xmmc2DATA4	CON1.24	CAM_B_D7
CON1.25	Xmmc3DATA1/Xmmc2DATA5	CON1.26	CAM_B_PCLK
CON1.27	Xmmc3DATA2/Xmmc2DATA6	CON1.28	CAM_B_VSYNC
CON1.29	Xmmc3DATA3/Xmmc2DATA7	CON1.30	CAM_B_HREF
CON1.31	Xi2sCLK1/PCM_SCLK1/AC97_BITCLK	CON1.32	CAM_B_FIELD
CON1.33	Xi2sCDCLK1/PCM_EXTCLK1/AC97_RESETn	CON1.34	CAM_B_CLKOUT
CON1.35	Xi2sLRCK1/PCM_FSYNC1/AC97_SYNC	CON1.36	CAMERA_B_GPIO0
CON1.37	Xi2sSDI1/PCM_SIN1/AC97_SDI	CON1.38	CAMERA_B_GPIO1
CON1.39	Xi2sSDO1/PCM_SOUT1/AC97_SDO	CON1.40	CAMERA_B_GPIO2
CON1.41	XpcmSCLK0/SPDIF_OUT0/Xi2sSCLK2	CON1.42	CAM_B_RESET
CON1.43	XpcmEXTCLK0/SPDIF_EXTCLK/Xi2sCDCLK2	CON1.44	Xi2cSCL1
CON1.45	XpcmFSYNC0/LCD_FRM/Xi2sLRCK2	CON1.46	Xi2cSDA1
CON1.47	XpcmSIN0/Xi2sSDI2	CON1.48	XpwmTOUT2
CON1.49	XpcmSOUT0/Xi2sSDO2	CON1.50	XpwmTOUT3/PWM_MIE
CON1.51	GND		
CON2	**Pin Define**	**CON2**	**Pin Define**
CON2.1	Xi2cSDA0	CON2.2	Xi2cSCL0
CON2.3	CAMERA_A_GPIO2	CON2.4	CAM_A_RESET
CON2.5	CON2.5 XciCLKenb	CON2.6	XciHREF
CON2.7	CON2.7 XciVSYNC	CON2.8	XciPCLK
CON2.9	XciYDATA 7	CON2.10	XciYDATA 6
CON2.11	XciYDATA 5	CON2.12	XciYDATA 4
CON2.13	XciYDATA 3	CON2.14	XciYDATA 2
CON2.15	XciYDATA 1	CON2.16	XciYDATA 0
CON2.17	VDD_SYS_3.3V	CON2.18	VDD_CAM_2.8V
CON2.19	VDD_CAM_1.8V	CON2.20	DGND

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CON2.21	Xi2cSDA2/IEM_SCLK	CON2.22	XEINT15
CON2.23	Xi2cSCL2/IEM_SPWI	CON2.24	XEINT14
CON2.25	XvVD0	CON2.26	XvVD1
CON2.27	XvVD8	CON2.28	XvVD9
CON2.29	XvVD16	CON2.30	XvVD1 7

2.1.3 Tiny210 CPU board interface

A: HDMI interface:
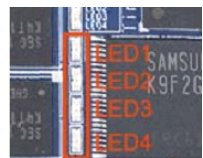
The S5PV210 support HDMI output, the Tiny210 CPU board expand the HDMI through the Type C miniHDMI interface, users can connect the board to a TV via an HDMI cable.

Note: Android support LCD and HDMI output in the same time.
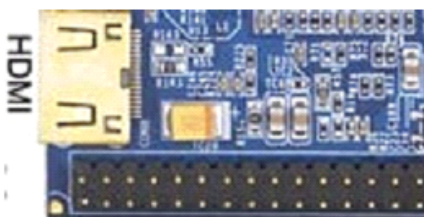
B. User LED

The Tiny210 CPU board have 4 User LED, you can light it with the low Voltage.

		LED1	LED2	LED3	LED4
	GPIO	GPJ_0	GPJ_1	GPJ_2	GPJ_3

C. JTAG interface

The Tiny210 CPU board leave the JTAG with test point moduel
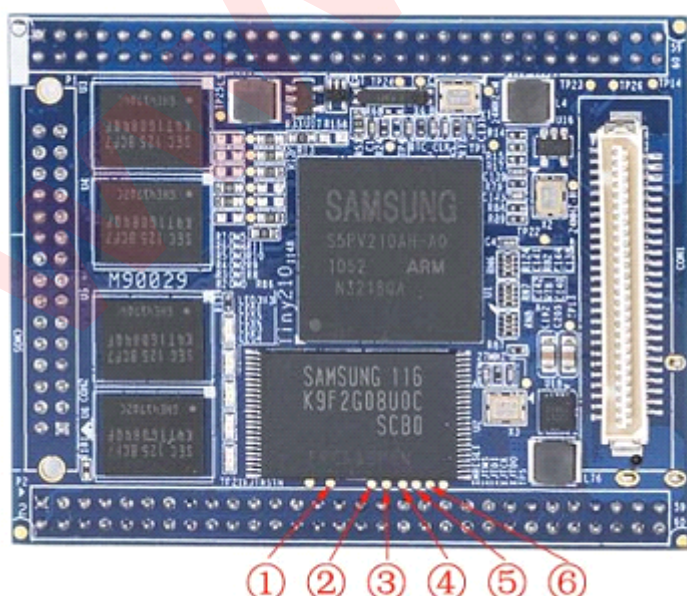
①XjRSTn
②XnRESET
③XjTMS
④XjTDi
⑤XjTCK
⑥XjTDO

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2.2 Tiny210V2 CPU board info

Tiny210V2 CPU board use the double-pin 2.0mm pitch, leads to the CPU the most common functional pin, expand four rows of pin-compatible (P1, P2, P3 and P4), it integrated LAN and Audio chips on CPU board. Tiny210V2 on board use the 512MB RAM and 2GB MLC Nand flash.

2.2.1 Tiny210 CPU board Feature
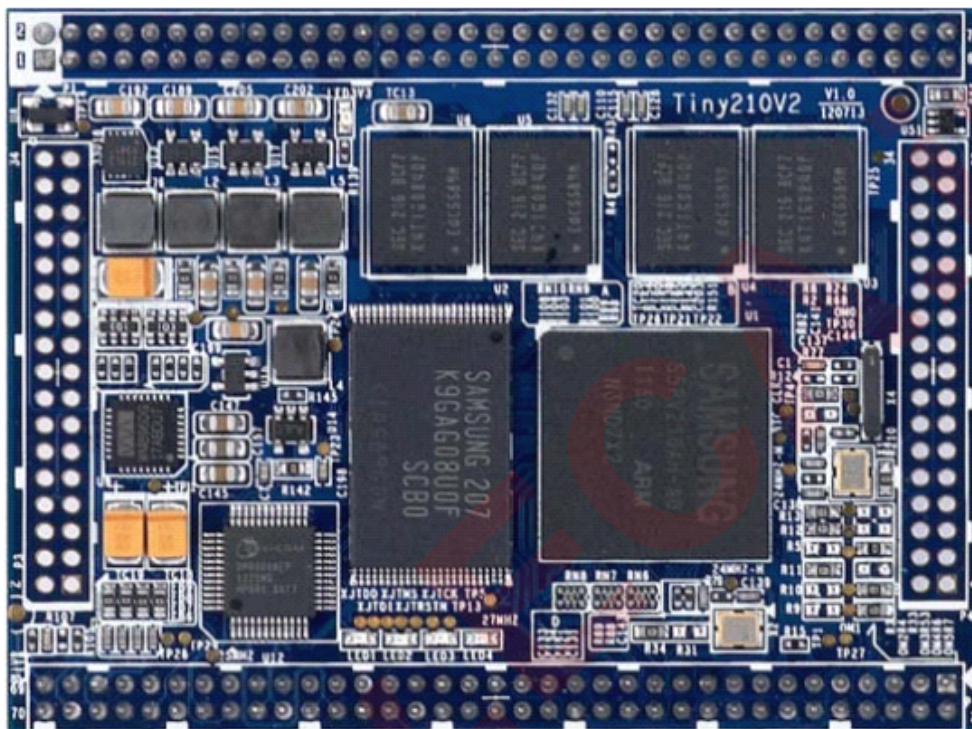
CPU: 1 GHz Samsung S5PV210, Base on CortexTM-A8
RAM: 512MB DDR2 RAM, 32bit data bus, 200MHz
FLASH: MLC NAND Flash: 2GB
Multi-IO:
- 2 x 60 Pin 2.0mm space DIP connector
- 2x 30 Pin 2.0mm space DIP connector

on Board:
- 4 x User Leds(Green)
- Ethernet Chip: DM9000AEP
- Audio Codec Chip: WM8960

Supply Voltage from 2V to 6V
Mechanical:
- 6 layer PCB
- Dimension: 74x 55 x 11mm

Software
- Android 2.3 + Linux-2.6.35
- Android 4.0(Provide Linux-3.0.8 Kernel Source code)
- Linux2.6.35 + Qtopia-2.2.0 + Qtopia4-Phone + QtE-4.7.0
- WindowsCE.NET 6.0(R3)

2.2.2 Tiny210V2 CPU board Pin Define
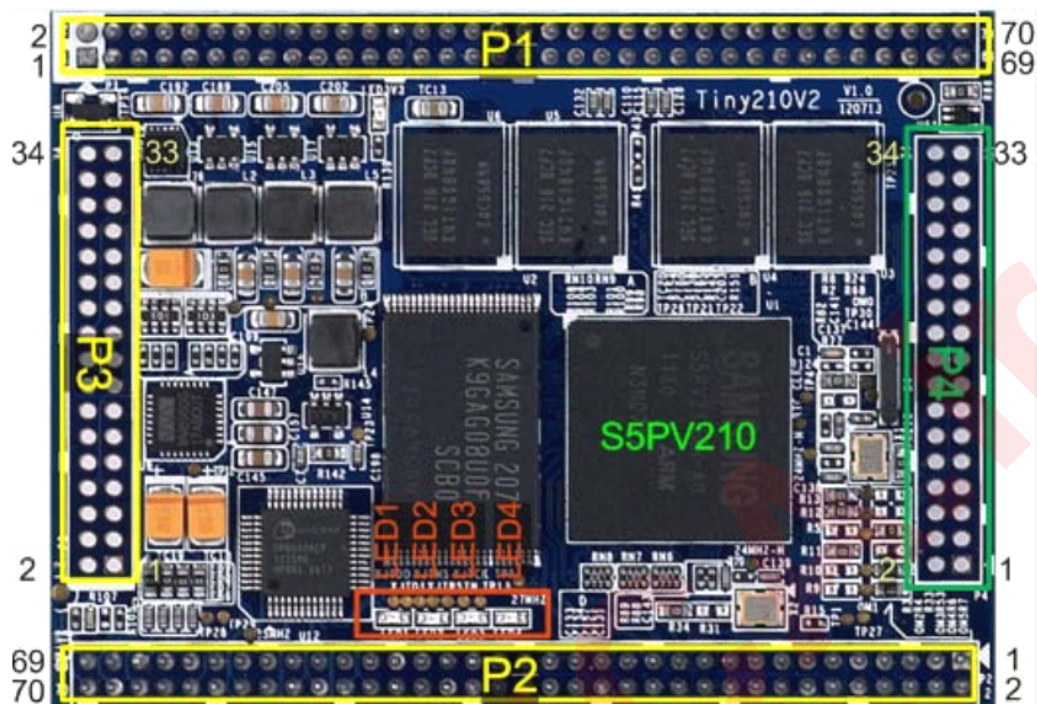
P1	Pin Define	P1	Pin Define
P1.1	5VDC Input	P1.2	GND
P1.3	VDD_RTC	P1.4	WIFI0_RESET_GPIO
P1.5	M anual Reset Input (Active Low)	P1.6	WIFI0_PD_GPIO
P1.7	XmmcCMD0	P1.8	Xmmc2CMD
P1.9	XmmcCLK0	P1.10	Xmmc2CLK
P1.11	Xmmc0DATA0	P1.12	Xmmc2DATA0
P1.13	Xmmc0DATA1	P1.14	Xmmc2DATA1
P1.15	Xmmc0DATA2	P1.16	Xmmc2DATA2
P1.17	Xmmc0DATA3	P1.18	Xmmc2DATA3
P1.19	Xmmc0CDn	P1.20	Xmmc2CDn
P1.21	XEINT16/KP_COL0	P1.22	XEINT24/KP_ROW0
P1.23	XEINT17/KP_COL1	P1.24	XEINT25/KP_ROW1
P1.25	XEINT18/KP_COL2	P1.26	XEINT26/KP_ROW2
P1.27	XEINT19/KP_COL3	P1.28	XEINT27/KP_ROW3
P1.29	XEINT10	P1.30	XEINT14
P1.31	XEINT11	P1.32	XEINT15
P1.33	XpwmTOUT0	P1.34	Xi2cSCL0
P1.35	XpwmTOUT1	P1.36	Xi2cSDA0
P1.37	XuhDM	P1.38	Xi2cSCL2
P1.39	XuhDP	P1.40	Xi2cSDA2
P1.41	VD0 (Blue LSB)	P1.42	VD1
P1.43	VD2	P1.44	VD3

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P1.45	VD4	P1.46	VD5
P1.47	VD6	P1.48	VD7 (Blue MSB)
P1.49	VD8 (Green LSB)	P1.50	VD9
P1.51	VD10	P1.52	VD11
P1.53	VD12	P1.54	VD13
P1.55	VD14	P1.56	VD15 (Green MSB)
P1.57	VD16 (Red LSB)	P1.58	VD17
P1.59	VD18	P1.60	VD19
P1.61	VD20	P1.62	VD21
P1.63	VD22	P1.64	VD23 (Red MSB)
P1.65	Vertical Synchronous Signal	P1.66	Horizontal Synchronous Signal
P1.67	RGB Data Sampling Clock	P1.68	RGB Data Enable
P1.69	GND	P1.70	Boot Mode Select
P2	**Pin Define**	**P2**	**Pin Define**
P2.1	XuTXD0	P2.2	XuRXD0
P2.3	XuTXD1	P2.4	XuRXD1
P2.5	XuTXD2	P2.6	XuRXD2
P2.7	XuTXD3	P2.8	XuRXD3
P2.9	XuCTSn1	P2.10	XuRTSn1
P2.11	CAM_A_D0	P2.12	CAM_A_D1
P2.13	CAM_A_D2	P2.14	CAM_A_D3
P2.15	CAM_A_D4	P2.16	CAM_A_D5
P2.17	CAM_A_D6	P2.18	CAM_A_D7
P2.19	CAM_A_PCLK	P2.20	CAM_A_VSYNC
P2.21	CAM_A_HREF	P2.22	CAM_A_FIELD
P2.23	CAM_A_CLKenb	P2.24	XhdmiTX1P
P2.25	XhdmiTX0P	P2.26	XhdmiTX1N
P2.27	XhdmiTX0N	P2.28	XhdmiTXCP
P2.29	XhdmiTX2P	P2.30	XhdmiTXCN
P2.31	XhdmiTX2N	P2.32	XEINT13/HDMI_HPD
P2.33	Xi2cSDA1	P2.34	Xi2cSCL1
P2.35	XuoID	P2.36	XspiCS0
P2.37	XuoDM	P2.38	XspiMISO0
P2.39	XuoDP	P2.40	XspiMOSI0
P2.41	XuoVBUS	P2.42	XspiCLK0
P2.43	XmipiMDPCLK	P2.44	XuoDRVVBUS
P2.45	XmipiMDNCLK	P2.46	GND
P2.47	XmipiMDP0	P2.48	Ethernet PHY RX-
P2.49	XmipiMDN0	P2.50	Ethernet PHY RX+
P2.51	XmipiMDP1	P2.52	Ethernet PHY TD-
P2.53	XmipiMDN1	P2.54	Ethernet PHY TD+
P2.55	XmipiMDP2	P2.56	Ethernet Link / Active LED
P2.57	XmipiMDN2	P2.58	EthernetSpeed LED
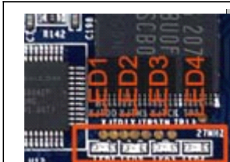
P2.59	XmipiMDP3	P2.60	GND
P2.61	XmipiMDN3	P2.62	Head Phone Detect
P2.63	Head Phone Output R	P2.64	Head Phone Output L
P2.65	SPK_OUT_LP	P2.66	SPK_OUT_LN
P2.67	PK_OUT_RP	P2.68	SPK_OUT_RN
P2.69	Mic Input P	P2.70	Mic Input N
P3	Pin Define	P3	Pin Define
P3.1	5VDC Input	P3.2	GND
P3.3	XEINT0	P3.4	XEINT1
P3.5	XEINT2	P3.6	XEINT3
P3.7	XEINT4	P3.8	XEINT5
P3.9	XEINT6	P3.10	XEINT8
P3.11	Xm0ADDR0	P3.12	Xm0ADDR1
P3.13	Xm0ADDR2	P3.14	Xm0ADDR24
P3.15	Xm0CSn0	P3.16	XnRSTOUT(System Reset Output)
P3.17	Xm0WEn	P3.18	Xm0OEn
P3.19	Xm0DATA0	P3.20	Xm0DATA1
P3.21	Xm0DATA2	P3.22	Xm0DATA3
P3.23	Xm0DATA4	P3.24	Xm0DATA5
P3.25	Xm0DATA6	P3.26	Xm0DATA7
P3.27	Xm0DATA8	P3.28	Xm0DATA9
P3.29	Xm0DATA10	P3.30	Xm0DATA11
P3.31	Xm0DATA12	P3.32	Xm0DATA13
P3.33	Xm0DATA14	P3.34	Xm0DATA15
P4	Pin Define	P4	Pin Define
P4.1	CAM_B_D0	P4.2	XEINT20/KP_COL4
P4.3	CAM_B_D1	P4.4	XEINT21/KP_COL5
P4.5	CAM_B_D2	P4.6	XEINT22/KP_COL6
P4.7	CAM_B_D3	P4.8	XEINT23/KP_COL7
P4.9	CAM_B_D4	P4.10	XEINT28/KP_ROW4
P4.11	CAM_B_D5	P4.12	XEINT29/KP_ROW5
P4.13	CAM_B_D6	P4.14	XEINT30/KP_ROW6
P4.15	CAM_B_D7	P4.16	XEINT31/KP_ROW7
P4.17	CAM_B_PCLK	P4.18	XEINT12/HDMI_CEC
P4.19	CAM_B_VSYNC	P4.20	GND
P4.21	CAM_B_HREF	P4.22	XadcAIN0
P4.23	CAM_B_FIELD	P4.24	XadcAIN1
P4.25	CAM_B_CLKOUT	P4.26	XadcAIN6_YM
P4.27	XspiMOSI1	P4.28	XadcAIN7_YP
P4.29	XspiMISO1	P4.30	XadcAIN8_XM
P4.31	XspiCS1	P4.32	XadcAIN9_XP
P4.33	XspiCLK1	P4.34	GND

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شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲

2.2.3 Tiny210V2 CPU board interface

A. User LED

The Tiny210 CPU board have 4 User LED, you can light it with the low Voltage.

		LED1	LED2	LED3	LED4
	GPIO	GPJ_0	GPJ_1	GPJ_2	GPJ_3

B. JTAG interface

The Tiny210 CPU board leave the JTAG with test point moduel

1) XjTDO
2) XjTDi
3) XjTMS
4) XjRStn
5) XjTCK
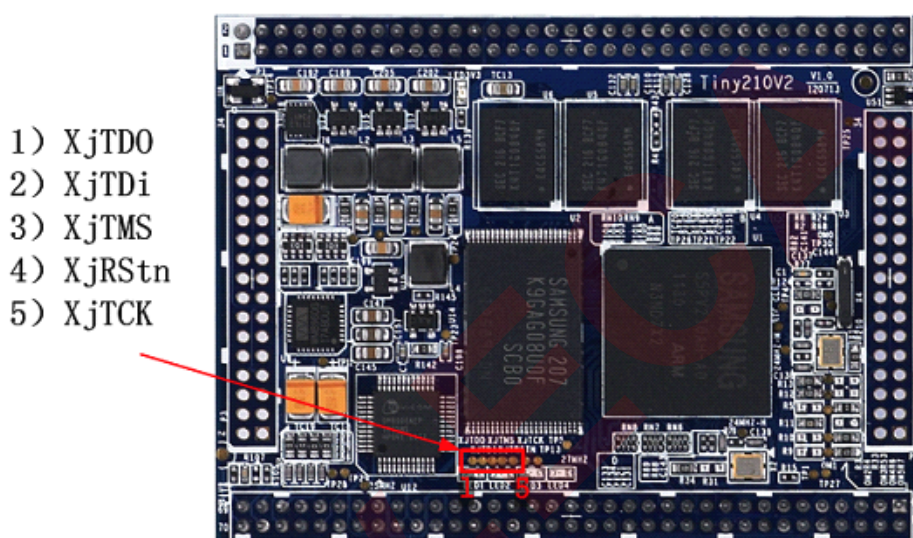
2.3 The different between Tiny210 and Tiny210V2

Item	CM-Tiny210	CM-Tiny210V2
Size	64 x 50 x 11(mm)	74 x 55 x 10 (mm)
CPU	Samsung S5PV210	Samsung S5PV210
DDR2 RAM	512MB DDR2 RAM @200Mhz, 32bit	512MB DDR2 RAM @200Mhz
Nand Flash	256MB SLC	**2GB MLC**
Ethernet	No	integrated DM9000AEP Chips
Audio	No	integrated Codec Chip: WM8960
Multi-IO	2 x 60 Pin 2.0mm space DIP connector 1 x 30 Pin 2.0mm space DIP connector 1 x 51 Pin 1.0mm space SMD connector	2 x 60 pin 2.0mm space DIP connector 2 x 34 pin 2.0mm space DIP connector
LED	4 x User Leds(Green) 1 x Power Led(Red)	4 x User Leds(Green)
Power Supply	from 2V to 6V	from 2V to 6V
PCB	8 layer	6 layer

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2.4 Tiny210SDK1(Tiny210 Mother board) introduce
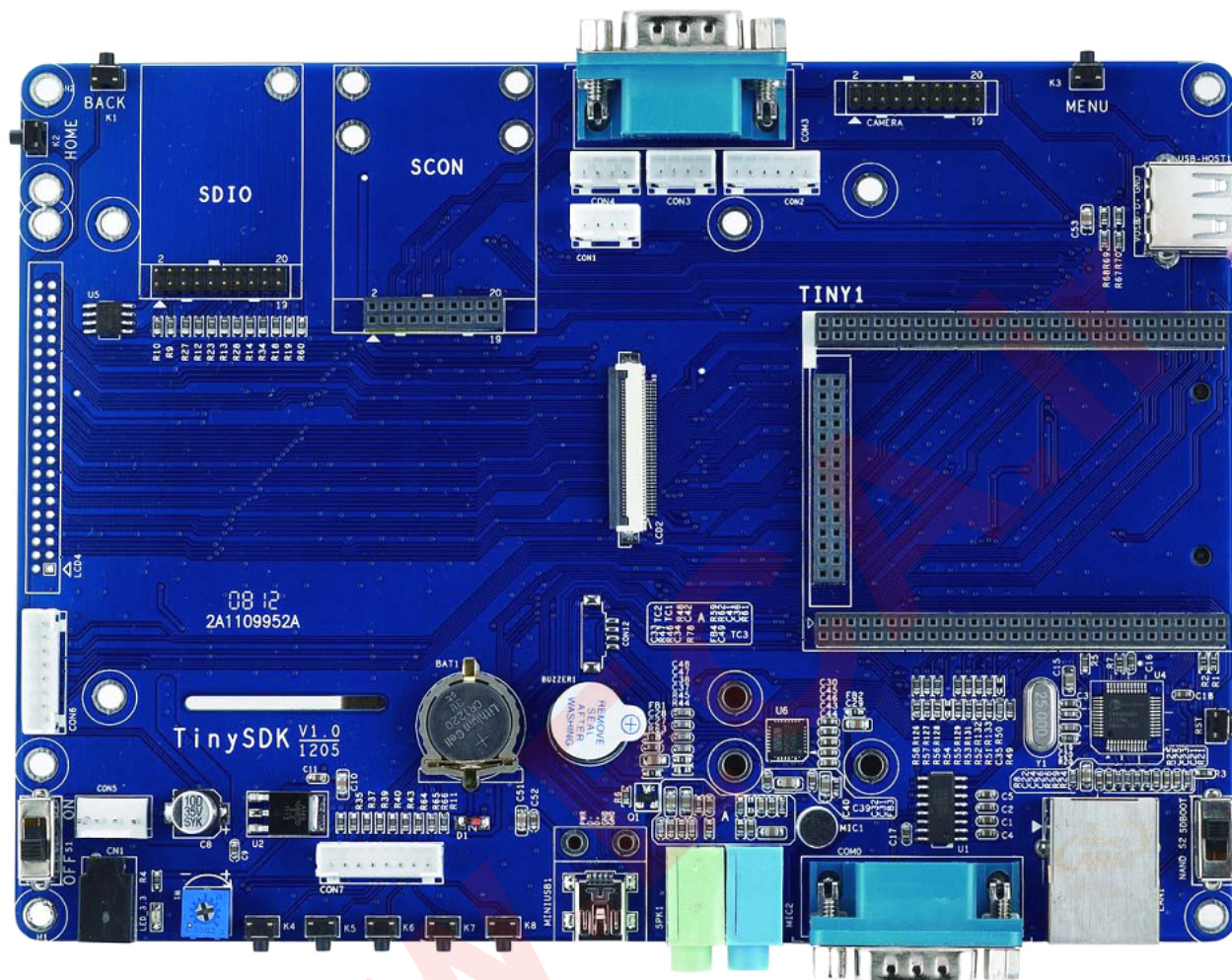
2.4.1 Tiny210 mother board(Tiny210SDK1) introduce

Interface	Tiny210SDK1 Mother board
USB Host	One **USB Host**: standard USB Host port
USB Slave	One(The Same)
Serial Port	**Four serial port**:　two of them have been converted to RS232, and leads through the DB9 Block (COM0, COM1), through the CON1, 2, 3, 4, Block leads to TTL level
Keys	Eight User keys
Ethernet	One RJ45 Ethernet port: DM9000AEP, 10/100M adaptive
Audio In/Out	One Audio In, One Audio Out, using the WM8960
ADC Input	Six ADC input
Buzzer	One, control by the PWM0
EEPROM	One, AT24C08 (256 Byte) for I2C test
LCD Interface	**Four LCD Interface**, both 40 Pin 0.5mm Pitch Chip Block, support 3.5 "-19" full color TFT display LCD Another one is for 45Pin LCD interface

| capacitance Touchscreen	Support, in the 45Pin LCD interface
SDIO interface	used to connect the SD WiFi module and other
CMOS Camera interface	used to connect CMOS camera Module
RTC Clock	with a backup battery :
PCB layer	Two layer
PCB Size	180 x 130mm, can be easily fixed all kinds of LCD modules, especially the 7-inch LCD module
Power Supply	DV-5V

2.4.2 Tiny210SDK1 interface

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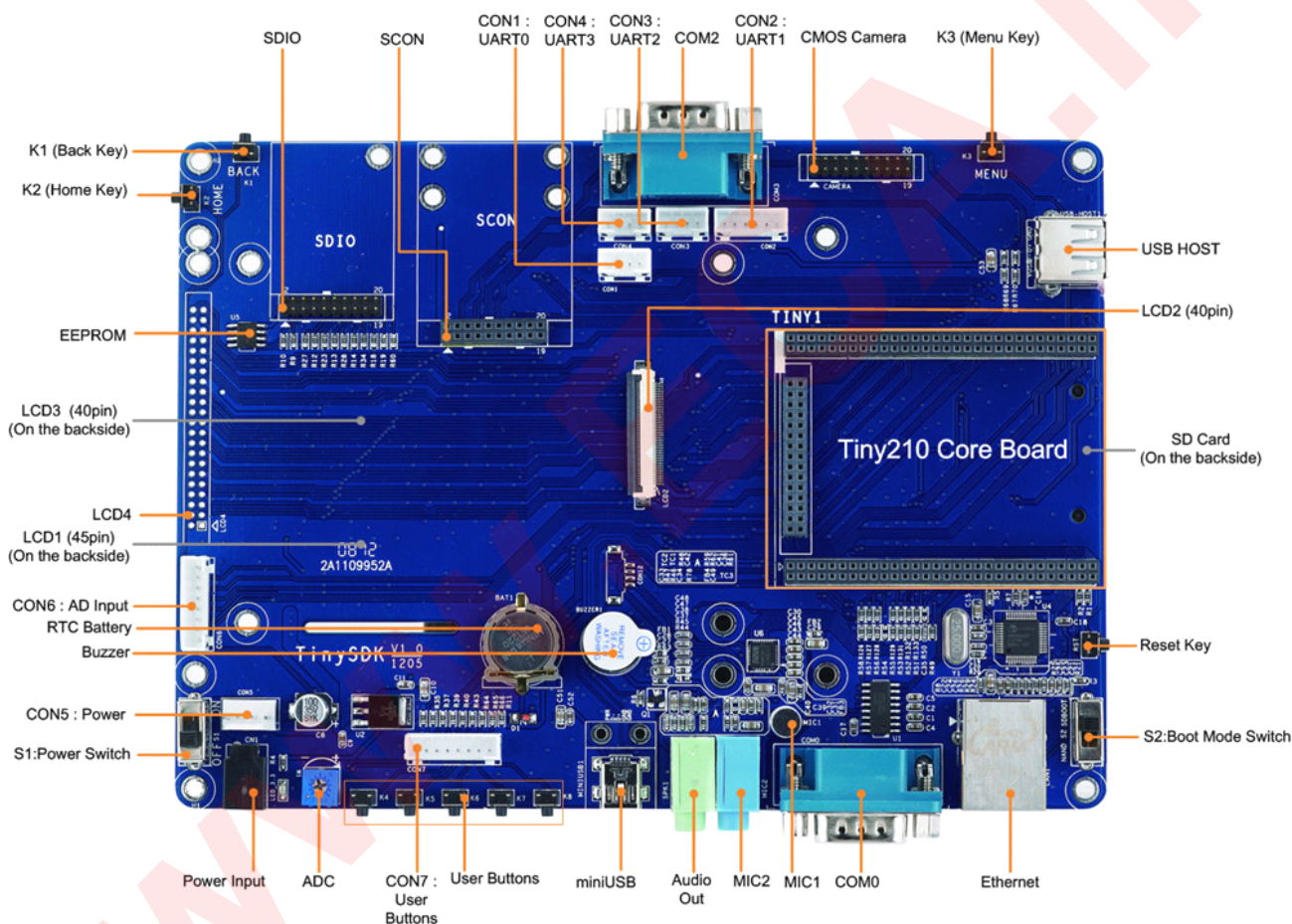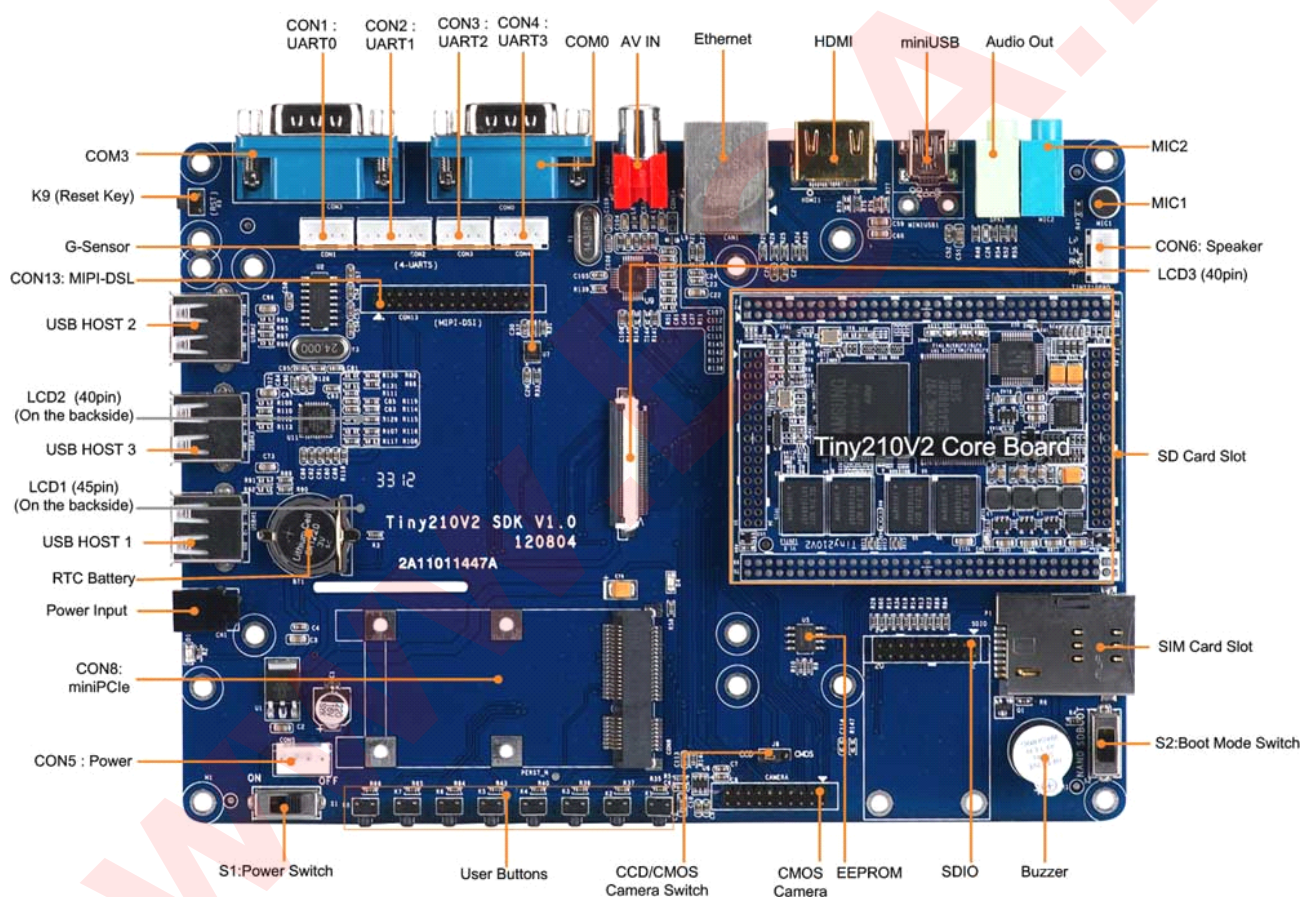
2.5 Tiny210V2SDK(Tiny210V2 Mother board) introduce
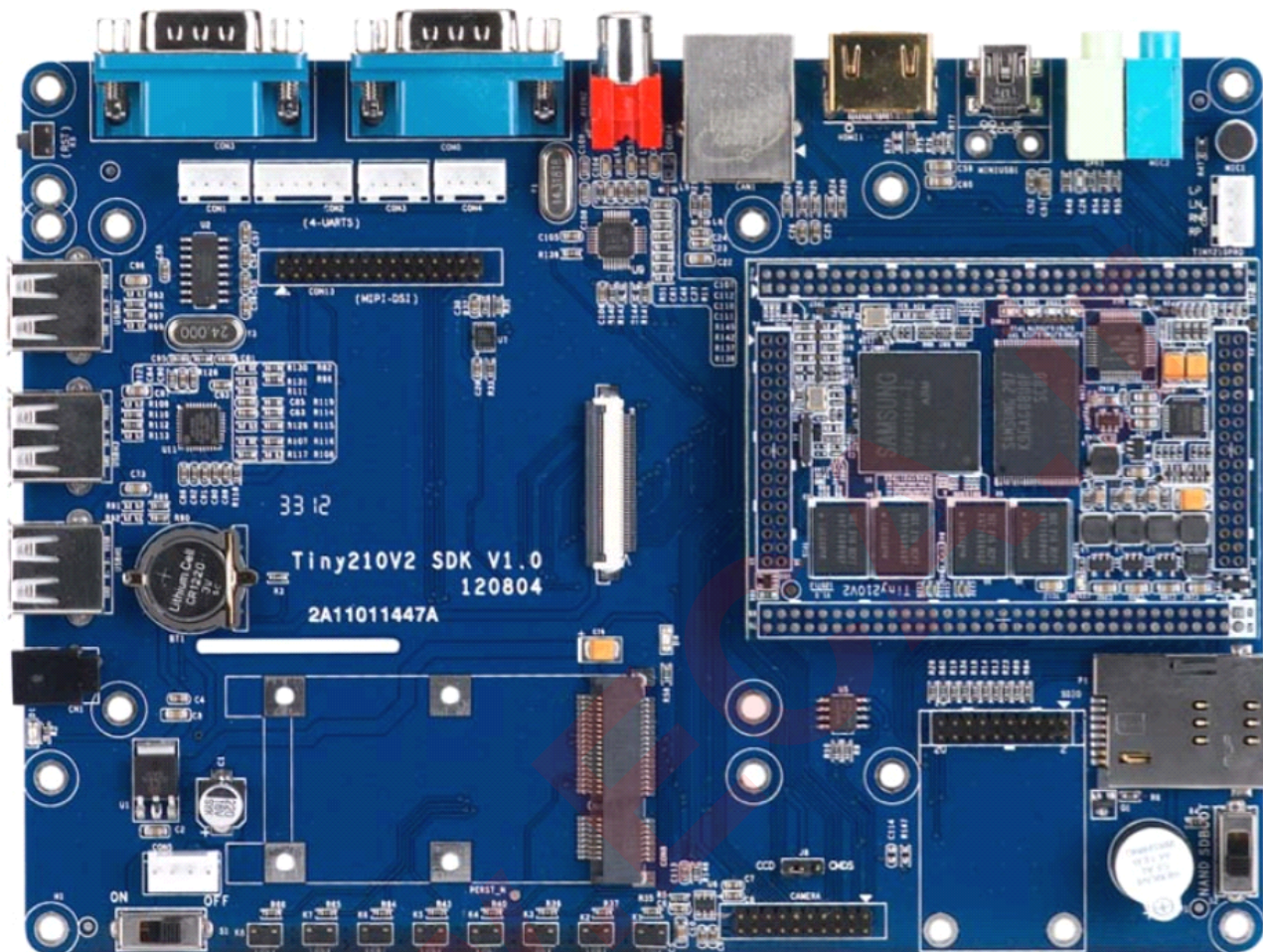
2.5.1 Tiny210V2 mother board(Tiny210V2SDK) introduce

1. Integrated USB 2.0 Hub: Extended 4 USB host ports, three of them as the standard side port, and one was lead by SCON interface

2. AV CCD Camera In: Integrated TVP5150 video chip: 2 AV input port (RCA), can be directly connected using a CCD camera

3. Expand MiniPCI interface: expand 3G Module

4. Serial Port: 4 serial port, two of them have been converted to RS232, and leads through the DB9 Block (COM0, COM1), through the CON1, 2, 3, 4, Block leads to TTL level

5. keys: 8 key

6. RJ45 Ethernet port: using DM9000AEP(On CPU board), 10/100M adaptive

7. Audio input and output: using the WM8960 professional audio chip(On cpu board), containing Class D amplifier on-board microphone, and supports HDMI audio and video synchronization output

8. USB Slave: 1 Road, the USB 2.0 specification

9. Buzzer: 1, control by the PWM0

10. EEPROM: AT24C08 (256 Byte) for I2C test

11. LCD Interface: 2 LCD interface, support 3.5 "-19" full color TFT display LCD

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12. Capacitive touch screen: I2C-based interface, on the 45Pin LCD connector

13. Resistive touch screen: 1-wired Touchscreen interface, On 40Pin LCD connector

14. SDIO interface: used to connect the SD WiFi module and other

15. CMOS Camera interface: used to connect CMOS camera

16. RTC clock: with a backup battery (according to different regions or time periods, mailing may remove the battery)

17. Gravity sensor Support

18. PCB layer: 2

19. PCB size: 180 x 130mm, can be easily fixed all kinds of LCD modules, especially the 7-inch LCD module

20. Power supply: DC-5V

2.5.2 Tiny210V2SDK interface

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2.6 The different between Tiny210SDK1 and Tiny210V2SDK

Item	Tiny210SDK1	Tiny210V2SDK	Note
CPU board	CM-Tiny210	CM-Tiny210V2	
Size	180 x 130mm	180 x 130mm	
Power Supplu	DC-5V	DC-5V	
SDIO	1	1	For SDIO WiFi Module
CMOS Camera Port	1	1	
AV In	No	1	Use TVP5150 chips, support Android/Linux
Serial Port(TTL)	4	4	Came from CPUs, 2 Serial was transmit to RS232
Serial Port(RS232)	2	2	
RS485	No	No	
LAN	1	1	Use the DM9000AEP chips
miniUSB 2.0	1	1	Not support OTG
USB Host 2.0	1	4(expand with HUB)	
LCD Port	4	2	Same LCD signal
Audio In/Out	Yes	Yes	Use the WM8960 Chips
Interrupt key	8	8	
adjustable resistance For ADC	1	No	For ADC Test
LED	4	4	On CPU board
I2C-EEPROM	1		For EEPROM Test
Buzzer	1	1	Control by PWM
RTC backup	Yes	yes	
HDMI	1	1	
Resistive touch screen	1-wire touch	1-wire touch	The same GPIO
Backlight adjustment	Yes	yes	The same
I2C-based capacitive Touch	1	1	On the 45Pin LCD connector
Serial port capacitive Touch	1	1	
MiniPCI interface	No	1	Support expand 3G module
SIM card slot	No	1	For MiniPCI 3G Module
Gravity sensor drive	No	Yes	

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2.7 Tiny210/Tiny210V2 development board interface introduce

This section provides a definition of the pin-outs and cables to be used with all of the connectors and headers on the board. In the DVD, we provide the schematic for the development board.
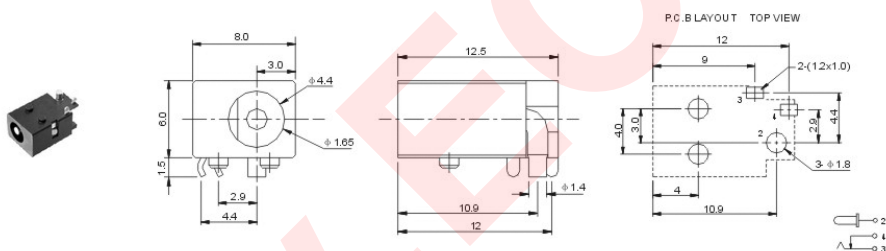
2.7.1 Power

The Tiny210 is powered by an external 5V power supply. It has two power inlets: CN1 is for 5V power adapter and the white CON13 is a 4 pin socket used to connect an external power supply when the board is embedded in a closed box.

CON13	No.	Pin define
	1	VDD5V
	2	GND
	3	GND
	4	VDDIN

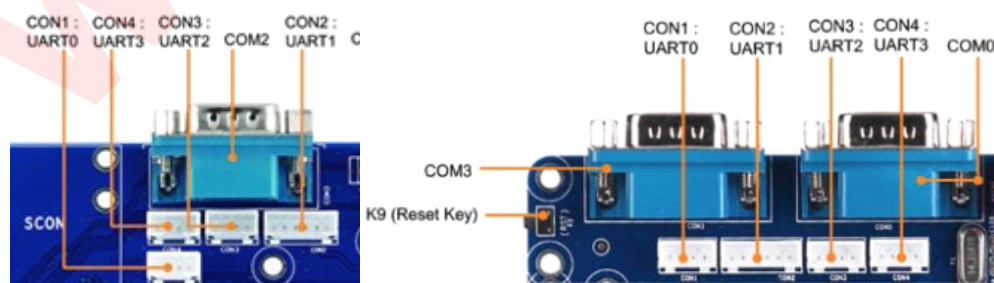The Power CN1 interface and size is as follow:

**Type: DC023B**

2.7.2 Serial Port

S5PV210 has 4 serial ports: UART0, 1, 2 and 3. UART0 and 1 are 5 wire serial ports and the other two are 3 wire serial ports.

On this board, UART0 and UART1 is converted via RS232 to COM0 and COM1 and can communicate with a PC via a serial port cable.

The 4 ports are connected to CPU via CON1-4. They are presented as below:

(Left is Tiny210SDK, Right is Tiny210V2SDK)

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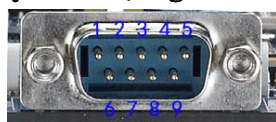
CON2	Pin Define (TTL)	CON1, 3,4	Pin Define (TTL)	COM0	Pin Define (Rs232)
1	RTSn	1	NC	1	NC
2	CTSn	2	NC	2	RSRXD
3	TXD	3	TXD	3	RSTXD
4	RXD	4	RXD	4	NC
5	5V	5	5V	5	GND
6	GND	6	GND	6	NC
				7	NC
				8	NC
				9	NC

COM1	Pin Define(Rs232)
1	NC
2	RSRXD
3	RSTXD
4	NC
5	GND
6	NC
7	RSCTSn
8	RSRTSn
9	NC

2.7.3 USB interface

The Tiny210 board has two kindUSB interfaces. One is a USB host 2.0 which is the same as a USB interface on a PC and can connect to a USB camera, keyboard, mouse, flash drive and other USB devices, it have 3 USB Host. The other is an OTG mini USB 2.0 which is usually used to download programs to a target board. When the board runs Android it can use for ADB debug function.

Mini USB interface:

Miniusb	Pin Define
5	GND
4	OTGID
3	D+
2	D-
1	Vbus

USB Host:

| Miniusb	Pin Define
4	5V
3	D-
2	D+
1	GND

2.7.4 Network Interface

The Tiny210 incorporates a DM9000 chip and can communicate with 10/100M networks. The RJ45 connector includes coupling filters and does not need transformers. With a common network cable, you can connect a router or switch to the Tiny210.

2.7.4 CCD AV Camera Interface

Tin210V2SDK have this interface.
The Tiny210SDK don't have this interface, support expand this function with AV module.

The board expand CCD AV Camera interface with TVP5150 chips, support CCD camera
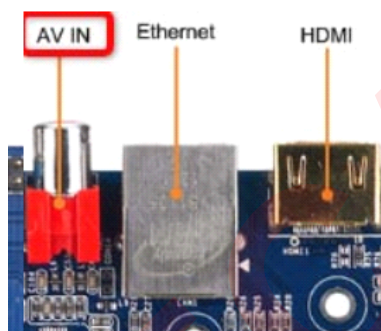
2.7.5 Audio Interface

The S5PV210 supports I2S/PCM/AC97. The Tiny210 has an I2S0 interface which uses WM8960 as the CODEC chip.
The audio output is a 3.5 mm spaced green plug, and WM8960 support D class power amplifier, so Tiny210 also expand the Speaker socket (CON7), the user can directly connected to 8 Ω 1 W speakers. The input is an on-board microphone. To get better audio quality please move the microphone as close as possible to the audio source when recording.
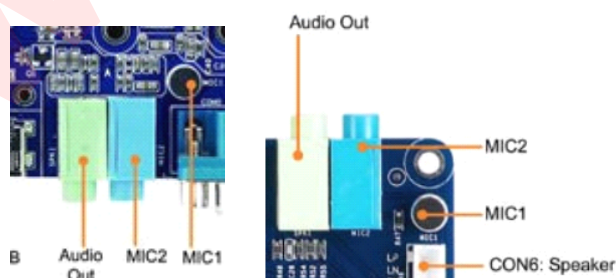
(Left is Tiny210SDK, Right is Tiny210V2SDK)

2.7.6 User Key

The Tiny210 has 8 test keys. They all are CPU interrupt input signals and will be triggered at a low level voltage. They can also be multiplexed to GPIO and other function interfaces. To multiplex them users

can extend them through CON12. These 8 keys are defined as follows:

KEY	K1	K2	K3	K4	K5	K6	K7	K8
Interrupt	EINT16	EINT17	EINT18	EINT19	EINT24	EINT25	EINT26	EINT27
GPIO	GPH2_0	GPH2_1	GPH2_2	GPH2_3	GPH3_0	GPH3_1	GPH3_2	GPH3_3

2.7.7 LCD interface

For users'convenience we incorporate two LCD interfaces on the board: LCD1 and LCD2. LCD1 is a 1.0mm spaced 41 pin connector and compatible with Mini2440 LCD;

The LCD connector has most of the commonly used control signals (line sweeping, clock, enable/disable) and complete RGB data signals (RGB output is 8:8:8 and can support LCDs up to 1.6M pixels). It has a PWM output and a reset signal (nRESET). LCD_PWR is the backlight switch signal.
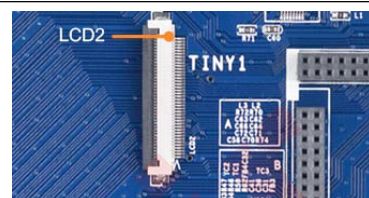
Notice: Because the use of 1-wired touchscreen, LCD1 does not include four-wire resistive touch pin from CPU, but the addition of I2C and interrupt pins (see LCD1-37,, 38,39,40), this is designed to will be able to use capacitive touch screen.

LCD2 will include a more extensive CPU pins, or detail table below the schematic.

LCD1&LCD2	Pin defines	LCD1&LCD2	Pin defines
1	VDD_5V	2	VDD_5V
3	VD0	4	VD1
5	VD2	6	VD3
7	VD4	8	VD5
9	VD6	10	VD7
11	GND	12	VD8
13	VD9	14	VD10
15	VD11	16	VD12
17	VD13	18	VD14
19	VD15	20	GND
21	VD16	22	VD17
23	VD18	24	VD19
25	VD20	26	VD21
27	VD22	28	VD23
29	GND	30	PWM1/GPD0_1
31	XEINT10/GPH1_2	32	nRSTOUT
33	VDEN	34	VSYNC
35	HSYNC	36	VCLK
37	I2CSCL2	38	XEINT14/GPH1_6
39	I2CSDA2	40	XEINT15/GPH1_7
41	GND		

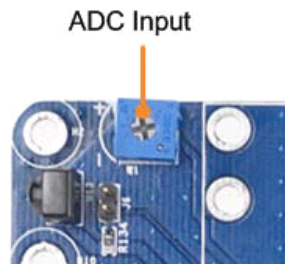## 2.7.8 ADC Input

Tin210SDK1 have this interface.

Tiny210V2SDK don't have this interface

The Tiny210 has 6 A/D conversion channels, According to different purposes, scattered in various interfaces:

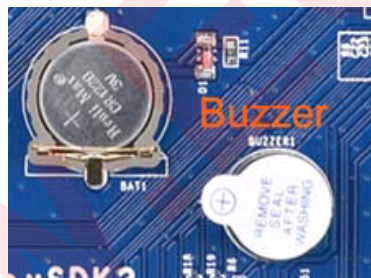AIN0 is connected to the adjustable resistor W1;

AIN1, 4, 5, 6 and 7 are extended via CON6's .

The S5PV210's AD conversion can be configured to 10-bit/12-bit.

2.7.9 PWM Buzzer

The on-board SPEAKER is controlled by PWM0, the diagram is shown below. PWM0 corresponds to **GPD0_0** which can be configured as PWM output via software or used as a GPIO.

2.7.10 I2C-EEPROM

The Tiny210 has an EEPROM AT24C08 connected to CPU's I2C. It has 256 bytes memory and is mainly for testing I2C bus.

2.7.11 SD card

The S5pV210 has four SDIO interfaces.
SDIO0 is commonly used for SD cards.

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2.7.12 SDIO-II/SD-WiFi interface

The SDIO4 of the S2PV210 is extended via CON9. It is a 2.0 mm spaced 20 pin connector and includes an SPI, an I2C and 4 GPIOs.
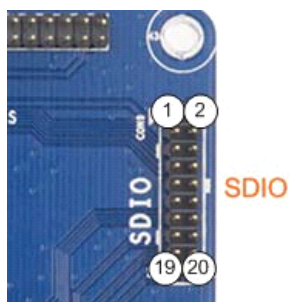
CON9	Pin define	CON9	Pin define
1	VDD_3.3V	2	GND
3	-	4	-
5	I2CSCL0	6	I2CSDA0
7	SPI0_MOSI0	8	SPI0_MISO0
9	SPI0_CLK0	10	SPI0_CS0
11	WIFI1_IO	12	WIFI1_PD_GPIO
13	SD1_CLK	14	SD1_CMD3
15	SD1_CDn3	16	SD1__nWP
17	SD1_DAT0	18	SD1_DAT1
19	SD1_DAT2	20	SD1_DAT3

2.7.13 CMOS camera interface

The Tiny210 has 1 CMOS camera interface. . It is a 20 pin 2.0mm connector, users can directly use the CAM130 module we provide. The CAM130 module does not have any circuits. It is basically just a converter and directly connects to a ZT130G2 camera module.

Notes: the camera interface is a multiplexed port. It can be used as GPIO by setting corresponding registers. The schematic below presents its pin details.

CAMERA A			
CON10	Pin define	CON10	Pin define
1	I2CSDA0	2	I2CSCL0
3	XciFIELD	4	CAM_A_RESET/GPJ3_1

5	CAM_A_CLK	6	CAM_A_HREF
7	CAM_A_VSYNC	8	CAM_A_PCLK
9	CAM_A_DATA7	10	CAM_A_DATA6
11	CAM_A_DATA5	12	CAM_A_DATA4
13	CAM_A_DATA3	14	CAM_A_DATA2
15	CAM_A_DATA1	16	CAM_A_DATA0
17	VDD_3.3V	18	VDD_2.45-2.8V
19	VDD_1.8V	20	GND

2.7.14 Mini PCIe interface

Tin210V2SDK have this interface.
**Tiny210SDK1** don't have this interface

Tiny210V2SDK provide a mini PCIe interface and SIM Card slot, it can connect a 3G opion module,
see it as follow:
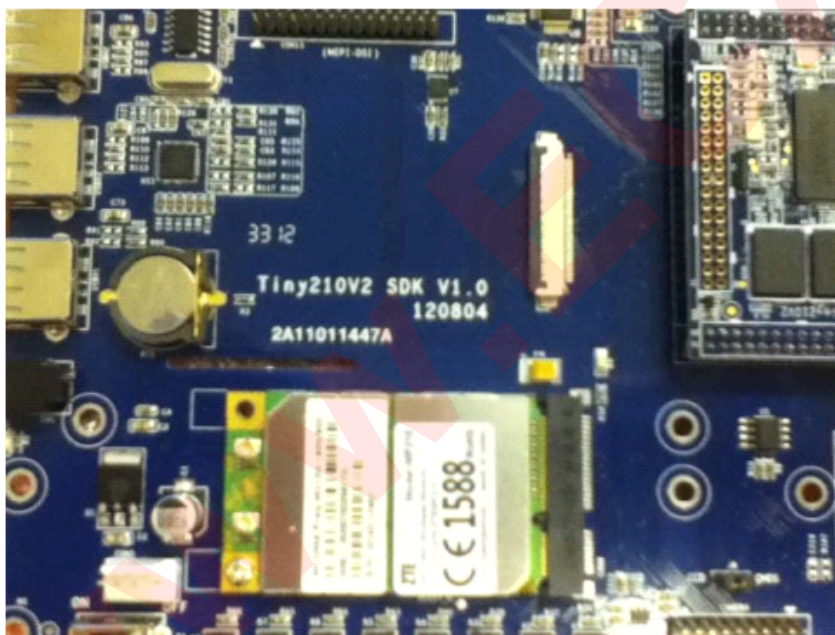
2.7.15 HDMI interface

The S5PV210 support HDMI output, the Tiny210 CPU board expand the HDMI through the Type C
miniHDMI interface, users can connect the board to a TV via an HDMI cable.
Note: Android support LCD and HDMI output in the same time.

miniHDMI
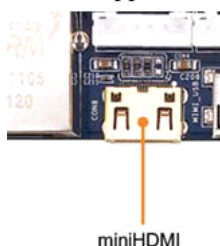
3 Getting Start for Tiny210

3.1   Unboxing Tiny210

So you just received your Tiny210 board and you may be wondering where to start...
This is the right place to get going.

3.2   Required Accessories

One Tiny210 Board with LCD module
One Serial cable
One net cable
One 5V@2A Power adapter
One DVD

3.3   Connection Guide

1. Set the Boot mode switch for Nand Flash boot mode.

2. Insert the power adapter to the Power interface(D), Don't power on the board.

3. Using a serial cable, connect the Debug serial port of the Tiny210SDK1/Tiny210SDK2 board to the
Serial Port on your PC.

4. insert the LCD cable to the LCD interface(E).

5. Power on the board(B), you can enter the Android system default.

3.4   Hyperterminal setting on PC

Notice: we provide the DNW as the Hyperterminal tools, you can use the other tools.

Open the DNW software, and configure it as follow:

1) Find DNW software under directory CD:\Tools\DNW.exe. Double-click to open it:

2) Click "Configuration -> Options", it will open the "UART/USB Options" dialog.

       choose '115200' in 'Baud Rate'

       choose 'COM1' in 'COM Port '(the COM1 means the serial number in PC   )

3) click 'OK' to finish the DNW configuration:

4) Click 'Serial Port->connect' to enable the DNW serial link.

Power on the board, then you can enter the Android system by the Hyperterminal on PC default.

4 Update the system for Tiny210

If you use Tiny210V2 board, please see Chapter 5(Update the system for Tiny210V2)

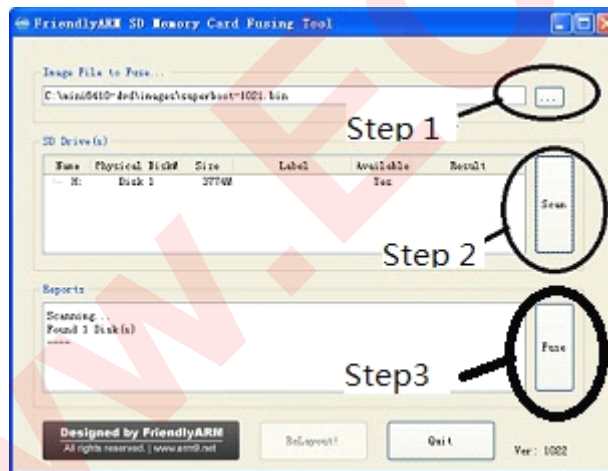**Notice:** Connect the board as Chapter 2.

Follow system image will be update:
- Linux and QT
- Android and Android 4.0
- WinCE 6.0

4.1 Create the SD boot card(SD Card, Micro SD Card)

4.1.1 Create the bootloader into SD-card.

Tiny210/Mini210s can support that update the system with SD Card(Mini210s use the Micro SD card), so we should create the Bootloader to the SD card firstly.

1. Insert a SD-card card into the PC(by SD-card reader).

2. run the SD-Flasher.exe tools with administrator privileges, then it will open the dialog that show "Select your Machine", please choose "mini210s/Tiny210", and click "Next".

3. At the "Image File to Fuse:" item, choose the "superboot.bin" file.(Step 1)

4. Click Scan in the tools, The Sd card will be show in the SD Driver item(Step2)

5. Click Fuse, The superboot.bin will be burn into the SD card.(Step 3)

Notice: SD-Flasher.exe Position -> CD:/tools/SD-Flasher.exe

superboot.bin Position -> CD:/images

If you using Win7 system, You should run the SD-Flasher.exe as Administator, and click **"Scan"**, **"Relayout**!" Before doing the above step.

4.1.2 Copy the system Image to SD card

Copy "images" folder into the SD-card.

Notice: "images" position -> CD:/images

If you want to burn the image you build, you can replace the image with the image you build. In the follow step, We will introduce the method to burn the 5.6"LCD image to flash, If you use the others LCD, you can edit the configure file FriendlyARM.ini file (FriendlyARM.ini position: SD:/images/FriendlyARM.ini).

4.2 Android 4.0 system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)
CheckOneButton=No
Action = Install
OS = Android

LCD-Mode = No
LCD-Type = H43

LowFormat = No
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

#################### Android 4.0.3 ####################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=ttySAC0
Android-RootFs-InstallImage = Android/rootfs_android.img
```

If you use the **Capacitive touch**, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Android

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
```

VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=ttySAC0 **skipcali=yes   ctp=2**
Android-RootFs-InstallImage = Android/rootfs_android.img

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

===
Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.
Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.
Step 4. Power on the board, the buzzer will ring one times.
Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.
Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.\

4.3 Android 2.3.1 system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:
#This line cannot be removed. by FriendlyARM(www.arm9.net)
CheckOneButton=No
Action = Install
OS = Android

LCD-Mode = No
LCD-Type = H43

LowFormat = No
VerifyNandWrite = No

```
CheckCRC32=No

StatusType = Beeper | LED


################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android2.3.1/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=s3c2410_serial0
Android-RootFs-InstallImage = Android2.3.1/rootfs_android.img
```

If you use the Capacitive touch, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Android

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED


################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android2.3.1/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=s3c2410_serial0 skipcali=yes ctp=2
Android-RootFs-InstallImage = Android2.3.1/rootfs_android.img
```

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

===

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The

LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

4.4 Linux system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS = Linux

LCD-Mode = No
LCD-Type = H43

LowFormat = No
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################### Linux ###################
Linux-BootLoader = Superboot210.bin
Linux-Kernel = Linux/zImage
Linux-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
Linux-RootFs-InstallImage = Linux/rootfs_qtopia_qt4.img
```

If you use the Capacitive touch, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Linux

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
```

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VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################## Linux ###################
Linux-BootLoader = Superboot210.bin
Linux-Kernel = Linux/zImage
Linux-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc skipcali=yes **ctp=2**
Linux-RootFs-InstallImage = Linux/rootfs_qtopia_qt4-mlc2.img

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

4.5 WinCE system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS = CE6

LCD-Mode = No
LCD-Type = S70

LowFormat = Yes
VerifyNandWrite = No
CheckCRC32=No

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```
StatusType = Beeper | LED

#################### Windows CE6.0 ####################
WindowsCE6-Bootloader = Superboot210.bin
WindowsCE6-BootLogo = WindowsCE6\bootlogo.bmp
WindowsCE6-InstallImage = WindowsCE6\NK.bin
WindowsCE6-RunImage = WindowsCE6\NK.bin
```

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

5 Update the system for Tiny210V2

If you use Tiny210 board, please see the Chapter 4(Update the system for Tiny210)

Notice: Connect the board as Chapter 2.

Follow system image will be update:

- Linux and QT
- Android and Android 4.0
- WinCE 6.0

5.1 Create the SD boot card(SD Card, Micro SD Card)

5.1.1 Create the bootloader into SD-card.

Tiny210/Mini210s can support that update the system with SD Card(Mini210s use the Micro SD card), so we should create the Bootloader to the SD card firstly.

2. Insert a SD-card card into the PC(by SD-card reader).

2. run the SD-Flasher.exe tools with administrator privileges, then it will open the dialog that show "Select your Machine", please choose "mini210s/Tiny210", and click "Next".

3. At the "Image File to Fuse:" item, choose the "superboot.bin" file.(Step 1)

4. Click Scan in the tools, The Sd card will be show in the SD Driver item(Step2)

5. Click Fuse, The superboot.bin will be burn into the SD card.(Step 3)

Notice: SD-Flasher.exe Position -> CD:/tools/SD-Flasher.exe

      superboot.bin Position -> CD:/images

      If you using Win7 system, You should run the SD-Flasher.exe as Administator, and click "**Scan**", "**Relayout**!" Before doing the above step.

5.1.2 Copy the system Image to SD card

Copy "images" folder into the SD-card.

Notice: "images" position -> CD:/images

If you want to burn the image you build, you can replace the image with the image you build. In the follow step, We will introduce the method to burn the 5.6"LCD image to flash, If you use the others LCD, you can edit the configure file FriendlyARM.ini file (FriendlyARM.ini position: SD:/images/FriendlyARM.ini).

5.2 Android 4.0 system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)
CheckOneButton=No
Action = Install
OS = Android

LCD-Mode = No
LCD-Type = H43

LowFormat = No
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################### Android 4.0.3 ###################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=ttySAC0
Android-RootFs-InstallImage = Android/rootfs_android-mlc2.img
```

If you use the **Capacitive touch**, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Android

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
```

```
VerifyNandWrite = No
CheckCRC32=No


StatusType = Beeper | LED


################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
        androidboot.console=ttySAC0 skipcali=yes   ctp=2
Android-RootFs-InstallImage = Android/rootfs_android-mlc2.img
```

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

==

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.\

5.3 Android 2.3.1 system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)
CheckOneButton=No
Action = Install
OS = Android


LCD-Mode = No
LCD-Type = H43


LowFormat = No
VerifyNandWrite = No
```

```
CheckCRC32=No

StatusType = Beeper | LED

################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android2.3.1/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
          androidboot.console=s3c2410_serial0
Android-RootFs-InstallImage = Android2.3.1/rootfs_android-mlc2.img
```

If you use the Capacitive touch, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Android

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################## Android 4.0.3 ##################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android2.3.1/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
          androidboot.console=s3c2410_serial0 skipcali=yes ctp=2
Android-RootFs-InstallImage = Android2.3.1/rootfs_android-mlc2.img
```

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

===
Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The

LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

5.4 Linux system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS = Linux

LCD-Mode = No
LCD-Type = H43

LowFormat = No
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################### Linux ####################
Linux-BootLoader = Superboot210.bin
Linux-Kernel = Linux/zImage
Linux-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
Linux-RootFs-InstallImage = Linux/rootfs_qtopia_qt4-mlc2.img
```

If you use the Capacitive touch, you should edit the file as follow;

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Linux

LCD-Mode = No
LCD-Type = H43

LowFormat = Yes
```

```
VerifyNandWrite = No
CheckCRC32=No

StatusType = Beeper | LED

################## Linux ##################
Linux-BootLoader = Superboot210.bin
Linux-Kernel = Linux/zImage
Linux-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc skipcali=yes **ctp=2**
Linux-RootFs-InstallImage = Linux/rootfs_qtopia_qt4-mlc2.img
```

For the param ctp=2, it means as follow sheet:

Cpt	Capacitive touch size	Capacitive touch name
0	NO	N/A
1	7inch	GT80X
2	4.3inch	FT5306
3	7inch	FT5406

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

5.5 WinCE system update

Step 1. In PC, open the file "images/FriendlyARM.ini" in TF-card and edit some item as follow:

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS = CE6

LCD-Mode = No
LCD-Type = S70

LowFormat = Yes
VerifyNandWrite = No
CheckCRC32=No
```

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```
StatusType = Beeper | LED

##################### Windows CE6.0 #####################
WindowsCE6-Bootloader = Superboot210.bin
WindowsCE6-BootLogo = WindowsCE6\bootlogo.bmp
WindowsCE6-InstallImage = WindowsCE6\NK.bin
WindowsCE6-RunImage = WindowsCE6\NK.bin
```

Step 2. Setting your LCD type by editing the LCD-Type = H43 Line in the FriendlyARM.ini file. The LCD type you can find on the LCD panel, at present, it can support H43, W50, A56, S70, A70, L80, G10.

Step 3. Set the board as SD card boot mode(set S2 for SDBOOT), and insert the SD card to the board.

Step 4. Power on the board, the buzzer will ring one times.

Step 5. Check the board LED and Buzzer, Buzzer will ring a bit of times, then it means update the system success.

Step 6. Set the board boot from the nand flash, and boot it again. you will enter the android system, for the first boot, it will calibrate the touchscreen.

6 software test demo

6.1 system software function overview

6.1.1 Android system function

The board provide the follow function for Android system, you can test it with the follow chapter.

2D/3D Acceleration	1080P HD video play	HDMI Output	3G Dial-up	3G SMS
CMOS Camera	Bluetooth	SD-WiFi	USB WiFi	Ethernet
GPS	iTest	Backlight control	ADB Debug	USB disk
Hardware access library	Wallpapers	Recording playback	GV310 Test SMS, phone	

6.2 Android system Test

6.2.1 keys introduce

Tiny210 have 8 keys, the position is as follow:

The function is as follow:

Keys Name	Function	Keys Name	Function
K1	Back	K5	Left
K2	Home	K6	Down
K3	Menu	K7	Right
K4	OK	K8	Up

6.2.2 Touchscreen calibrate

When you boot the board firstly, it will enter the touchscreen calibrate interface, you can calibrate it on the LCD.
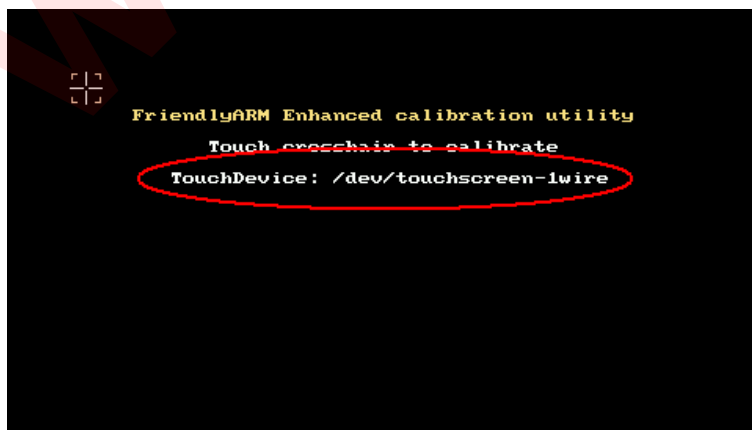
6.2.3 rotating screen

Android 2.3 horizontal screen is displayed defaulty, to switch to vertical display, you can press the Menu key(K3) on the development board, horizontal and vertical screen display as shown below:
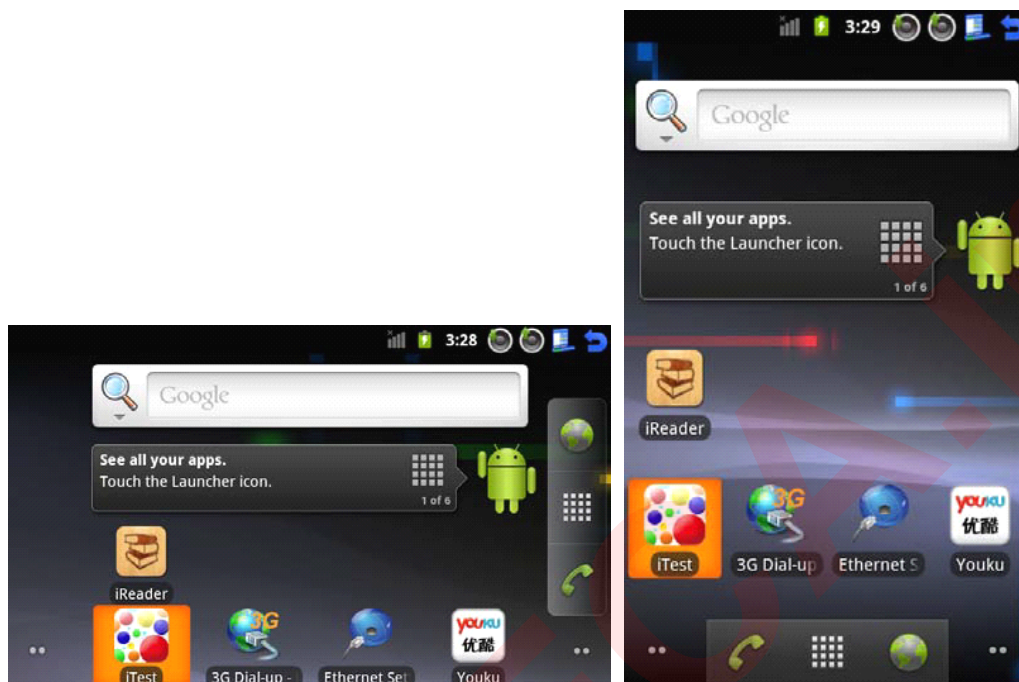
6.2.4 shortcut icon on the status bar

We add four additional shortcut icons on the status bar, the functions is as follow:
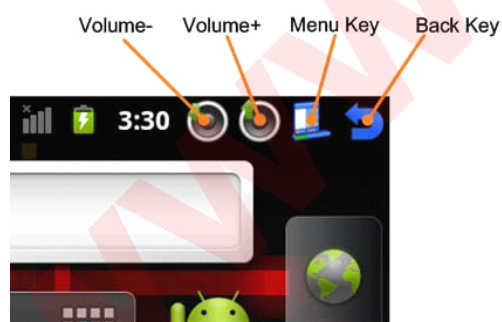
6.2.5 Play MP3

Android system can play the MP3 in the TF-card, see the samples picture:
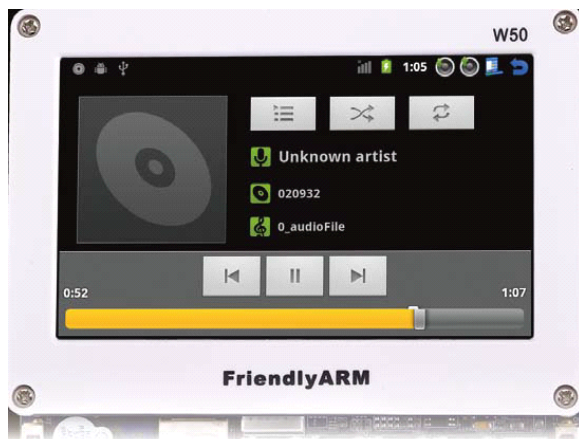
6.2.6 Adjust the volume

You can adjust the volume with the follow speaker icon on the status bar.
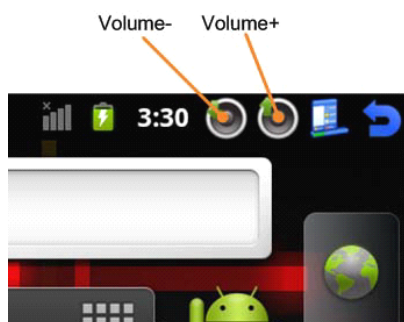
6.2.7 Recording

You can recording with the DroidRecord software.

6.2.8 WiFi wireless Internet access

As shown below, Tiny210 need to insert the SD-WiFi module and use it.
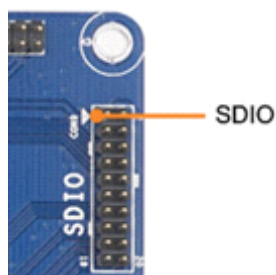
Press Menu(K2) and choose "Setting" to enter the Setting interface,
and choose "wireless & Network" -> "Wi-Fi", then you can use it.
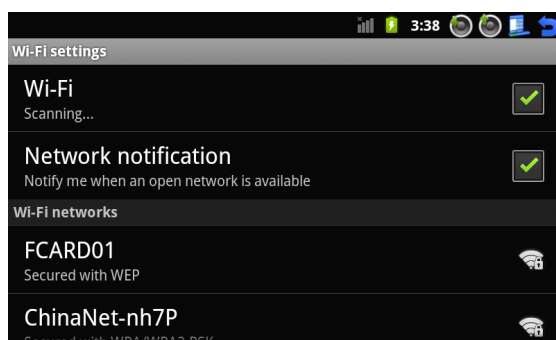
6.2.9 camera Test

Insert the CMOS camera Module or USB Camera into the Tiny210 CMOS interface/USB interface
(CON10).
Run the Camera program on the main menu, then it will show as follow:

6.2.10 CCD camera Test(AV in)

If you want to use the CCD camera, you should burn the zImage_tvp5150 to the board, then test it as
follow:
Insert the CCD camera Module   into the Tiny210SDK1 CMOS interface(If you use the Tiny210SDK2,
it have the tvp5150 chips, only set the switch to CCD).
Run the Camera program on the main menu, then it will show as follow:

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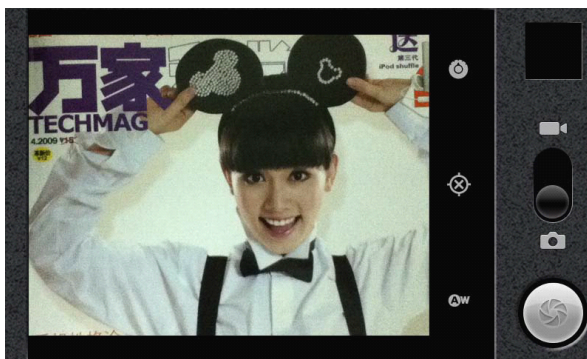
6.2.11 HDMI output

Link the Tiny210 HDMI(Type C) interface to TV with HDMI Cable, Tiny210 can synchronize the output on the screen to the TV, if you play the video, the sound will sync output to the TV, as shown below:
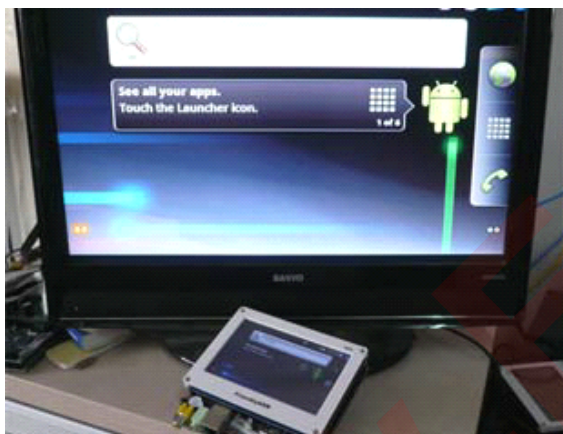
The format of the HDMI output can be set, you can set it as follow:

Press Menu(K2) and click "Setting" to enter the Setting menu interface, choose "Disply" menu.
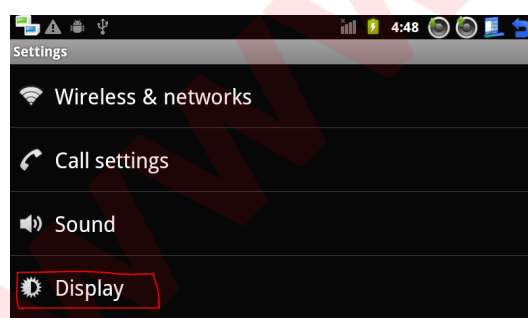
You can set the Resolution from 480p to 1080p with the "TV Resolution" menu.
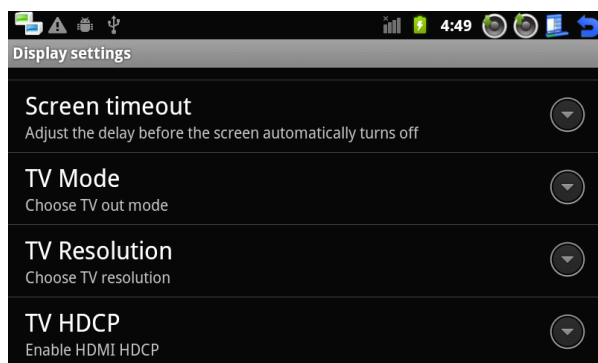
6.2.11.2 HDMI Output without LCD

You can update the system with the follow param in the friendlyARM.ini file, then it can support more HDMI resolution output.

More update the system moethod, please refer to the chapter 2.

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Android
LCD-Mode = No
LCD-Type = HDMI720P60
LowFormat = Yes
VerifyNandWrite = No
CheckCRC32=No
StatusType = Beeper | LED



################### Android 4.0.3 ###################
Android-BootLoader = Superboot210.bin
Android-Kernel = Android/zImage
Android-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc
         androidboot.console=s3c2410_serial0 skipcali=yes
Android-RootFs-InstallImage = Android/rootfs_android.img
```

It can support the follow param for the LCD resoulution.

LCD-Type	Resolution	TV Resolution	
HDMI1080P60	1920x1080	1920x1080	
HDMI1080I60	1920x1080	1920x1080	
HDMI1080P30	1920x1080	1920x1080	
HDMI1080P60D	960x536	1920x1080	Andorid4 not support
HDMI1080I60D	960x536	1920x1080	Andorid4 not support
HDMI1080P30D	960x536	1920x1080	Andorid4 not support
HDMI720P60	1280x720	1280x720	
HDMI720P60D	640x360	1280x720	
HDMI576P16X9	720x576	720x576	

HDMI576P16X9D	720x576	720x576
HDMI576P4X3	720x576	720x576
HDMI576P4X3D	720x576	720x576
HDMI480P16X9	720x480	720x480 Andorid4 not support
HDMI480P16X9D	720x480	720x480 Andorid4 not support
HDMI480P4X3	720x480	720x480 Andorid4 not support
HDMI480P4X3D	720x480	720x480 Andorid4 not support

6.2.12 HD Video play

Put the HD Video to TF-card(video support m p4, and audio suppot aac format). Then open ES File Brower, find your video file in TF-card.

Click it and Play it, it can support 1080p video play.

6.2.13 play Flash file on the website

If you want to play flash, you should install a Flash Plug-in, you can find it on the adobe website. The follow picture is the sample:

6.2.14 GPS Test

Tiny210 support GPS device(with serial port) on android 2.3.4, the default device inode is /dev/s3c2410_serial1.
If you use the other interface GPS Device(such as the USB GPS device), you can use it by editing the init.rc file and add the follow word.

```
setprop ro.kernel.android.gps /dev/ttyUSB0
```

Link the GPS Device(serial port) to the Tiny210 board CON2 interface(default inode is s3c2410_serial1), then you can use the map with GPS.
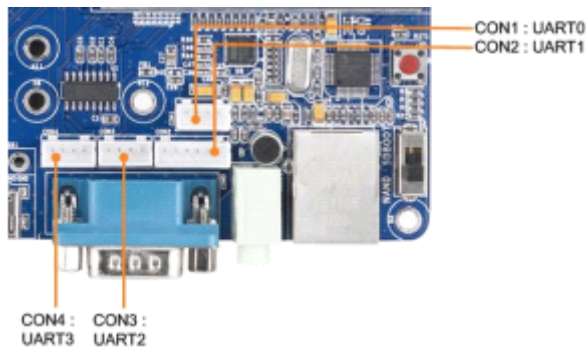
6.2.15 Ethenet Setting

Android has an ethernet configuration utility "Ethernet Setting"

Click on it, it will connect the ethernet by DHCP mode automatically.
And if you want to set configure IP, click the "Setting" to set it.

6.2.16 3G Networking

We specially developed a 3G network utility for Android. It can automatically detect and support upto more than one hundred USB network cards for all these systems: WCDMA,   CDMA2000 and TD-SCDMA.
Our following example was tested with HUAWEI E1750 for WCDMA
Step1: Insert a SIM card into your USB card

Step2: Connect your USB card to the board and start the 3G utility

Step3: the 3G utility will detect the E1750 card. Click on its icon

Step4: in the dialog shown below there is an orange icon with a "-" in the center. This means no network is connected. Click on "Connect" to start connection
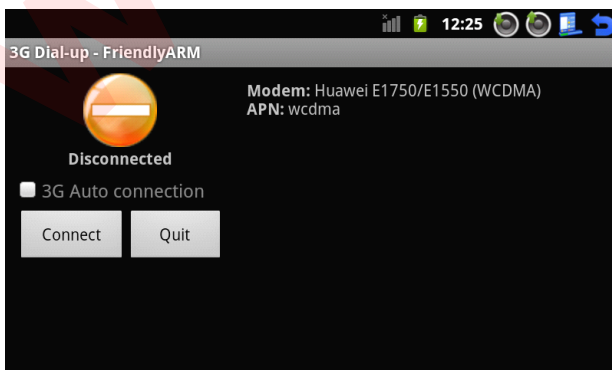
Step5: the connection process may take a while
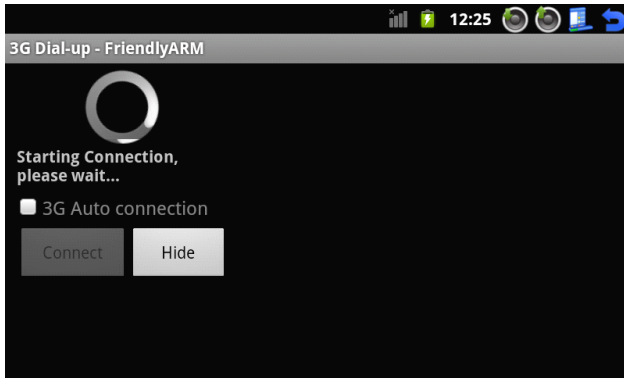
Step6: if the connection is a success the orange icon will turn green and shows "Connected" and mean while FriendlyARM's websites will be listed and a "3G" icon will show up in the upper left of the screen.
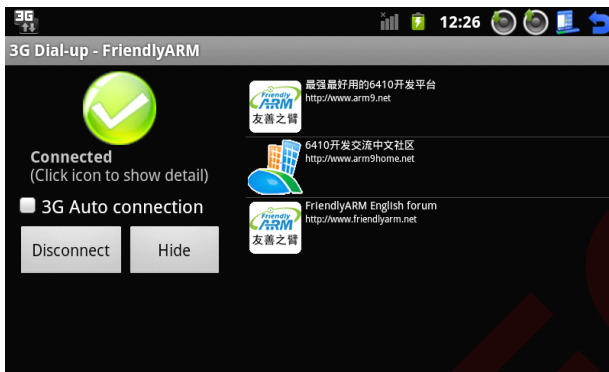
Step7 Click on the green icon you will see the current network information
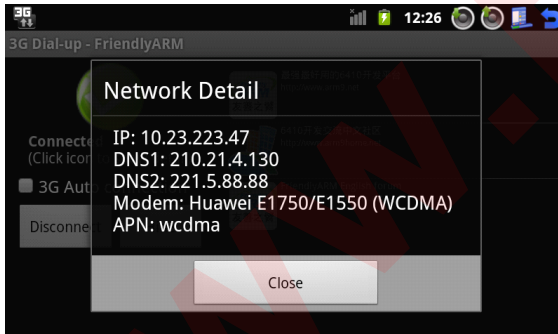
Step8 choose the "3G Auto connection, and "Click on "Hide" to run it on background
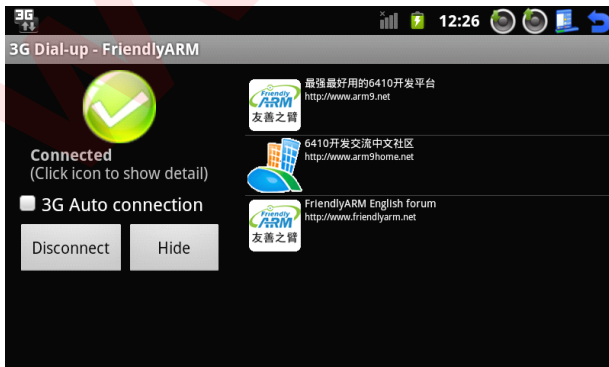
Step9 try youku.com

Step10: to close the connection click on the "3G Network Status" icon to return to the main menu andclick on "Disconnect"
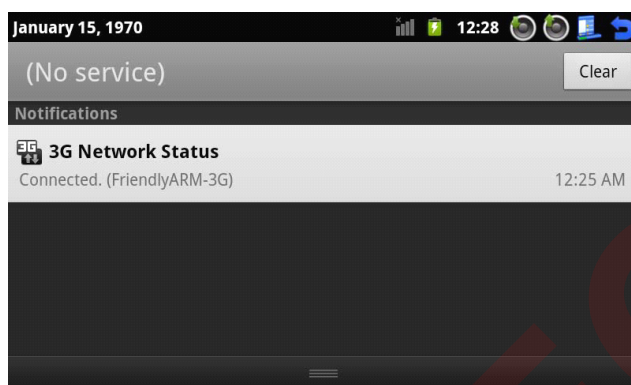
6.2.17 3G SMS seting

Set the 3G network as the last chapter, then you can send the SMS.

6.2.18 USB Bluetooth

Android supports various USB bluetooth adapters. Please connect your USB Bluetooth card to the USB host on the board.

Press K3 and click on "Settings" to enter the configuration menu.
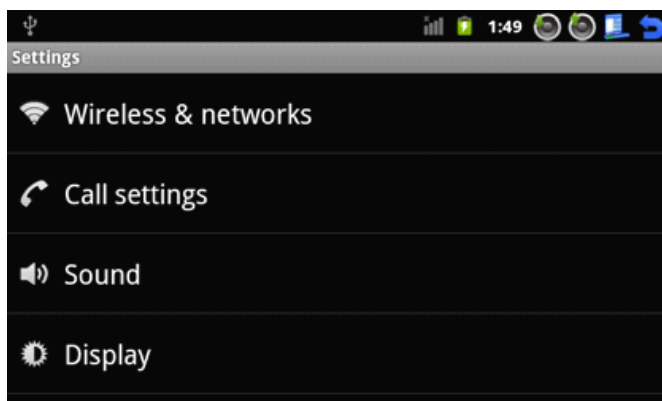
Click on "Wireless & networks" to enter the wireless network setting
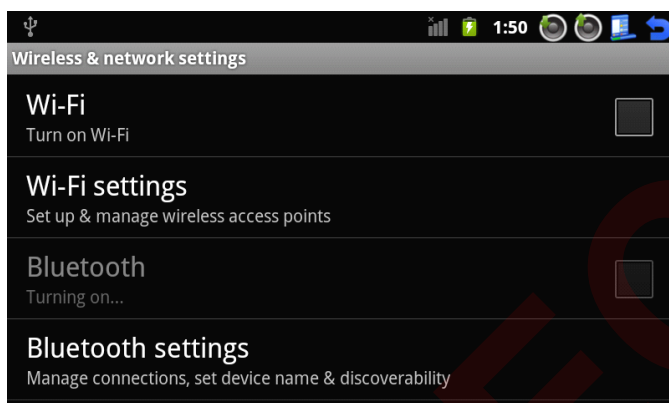
Click on "Bluetooth settings" and check "Bluetooth" to start the Bluetooth service. It will search for nearby bluetooth devices and list them.
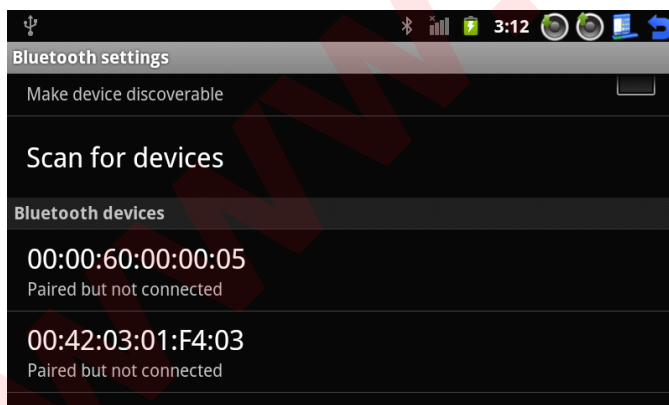
Then you can use it.

6.2.19 USB Disk

Android supports plug and play of USB flash drives up to a maximum of 32G (note: the drive should be formatted to FAT32).

1. Insert your drive to the USB host and a flash drive icon will apprear in the upper left of the screen.	2. Pull down the task bar on the top	3. Click on the drive icon

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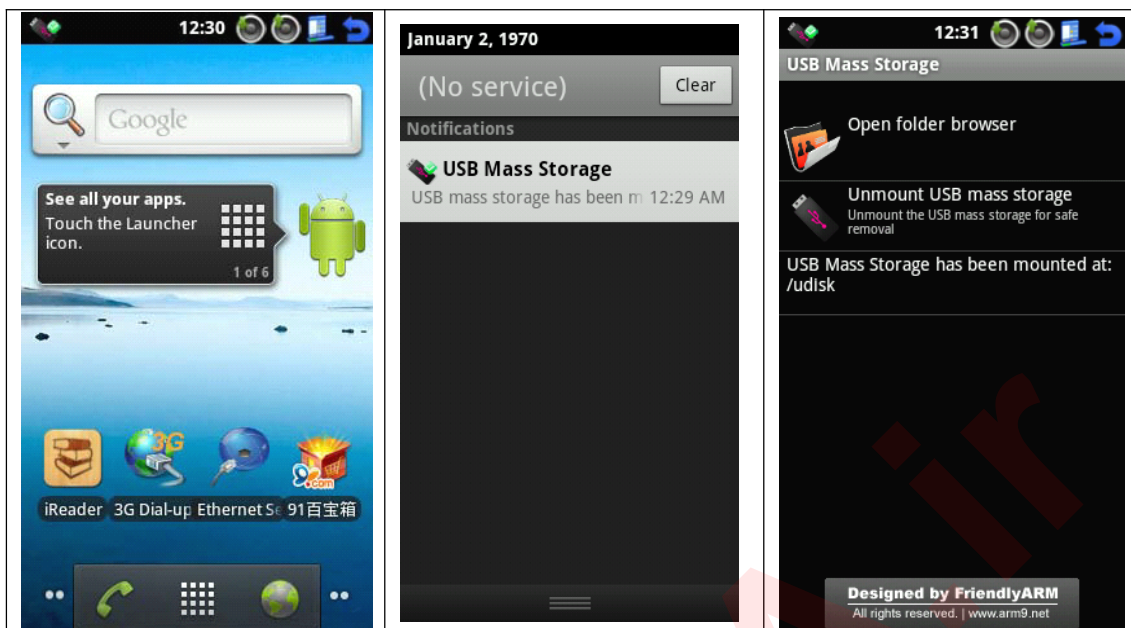
Click on "Umount USB mass storage" you will unmount your drive. Click on "Open folder brower" you can browse your files.

6.2.20 Backlight Control

Maybe you have noticed that after the system boots the backlight will turn off gradually if the touch screen doesn't receive any touch. This is manipulated by the backlight control. Click on "Sound & display"
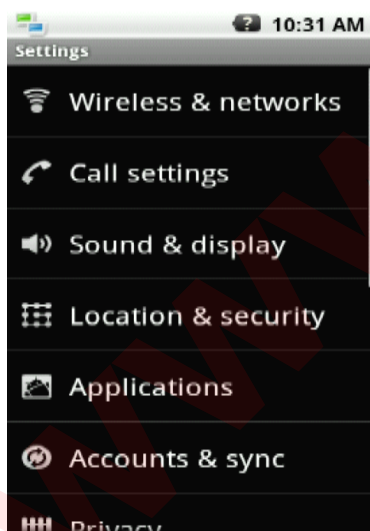
Locate "Display settings"	Click on "Brightness" you can set its brightness	Click on "Screen timeout" you can set its turn off time

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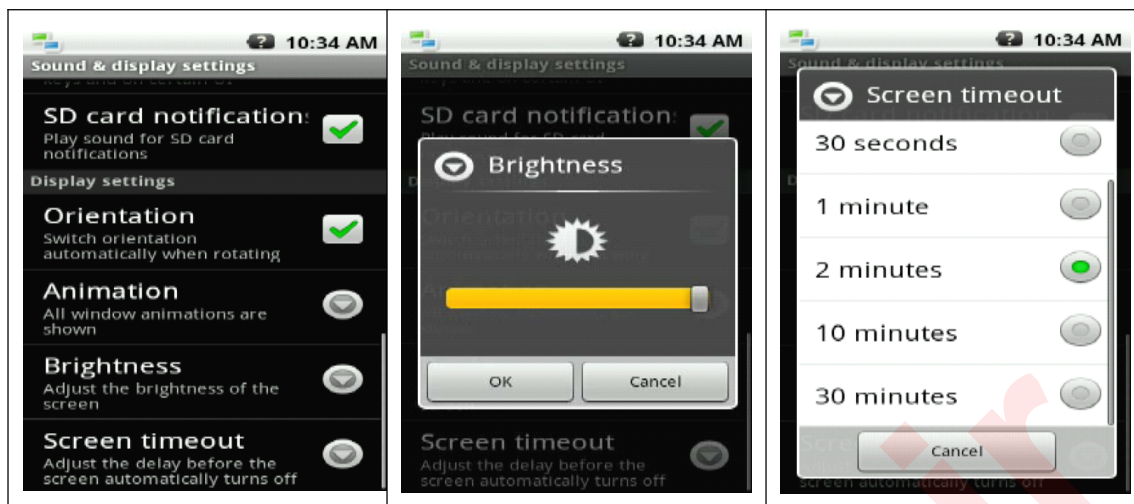
6.2.21 Serial Port Assistant

To launch our serial port assistant utility, you can click on the "iTest" icon
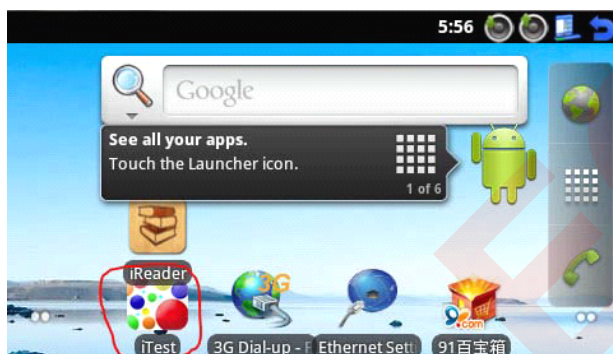
Click on "Serial Port Assistant" and you can set up its parameters as follows:
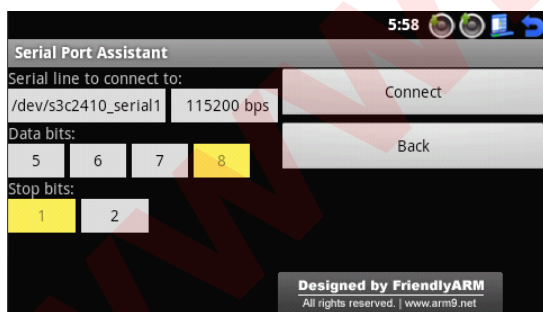
After setup is done, click on "Connect" and if the connection is successful you will see the following messages from the serial port
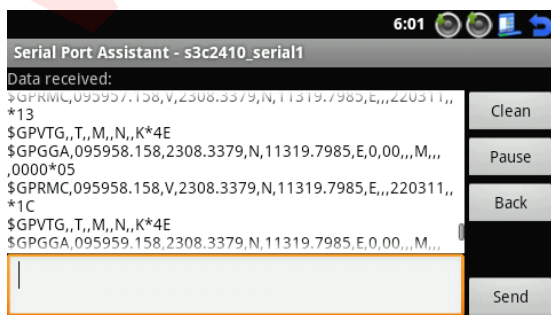
To send data to the serial port, you can type your messages in the left text box and click on "send"."

Pause" pauses messages' popping and "Clean" removes all the received messages

6.2.22 LED Testing

To test LEDs, please click on the "iTest" icon
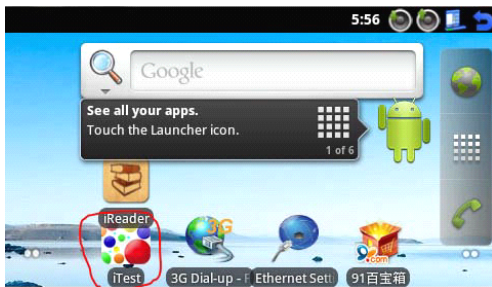
Click on "LED Testing" and you will see the following window and be able to test LEDs by clicking on those buttons

6.2.23 PWM Buzzer

To test PWM, please click on the iTest icon

Click on "PWM Testing" you will see the following window

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On the dialog, you can type a frequency and "start" or adjust the frequency by clicking on "+" and "-" .Tostopit you can click on "stop".

6.2.24 ADC Testing

To test ADC, please click on the "iTest" icon

Click on "A/D Convert" you will see the following window

6.2.25 I2C-EEPROM

To test "I2C-EEPROM" please click on the "iTest" icon

Click on "IIC/EEPROM Testing" you will see the following window
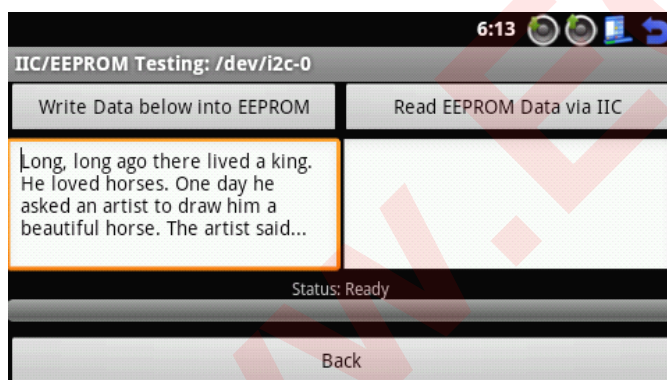
6.2.26 Use the EM310 Module to phone and SMS

To test GPRS Module with EM310, we need insert the EM310 to the board.

For the EM310 Module, you can order it from us.
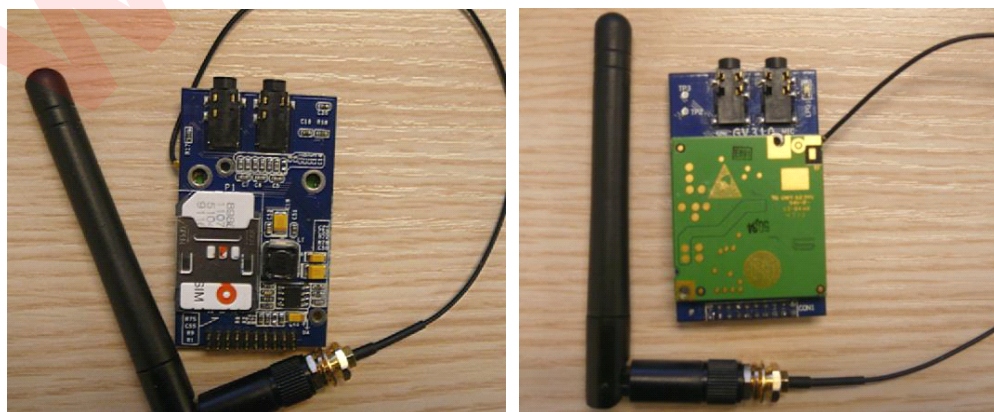
The EM310 contain the phone interface and SIM card slot.

Insert the EM310 to the SCON of the TIny210 board.
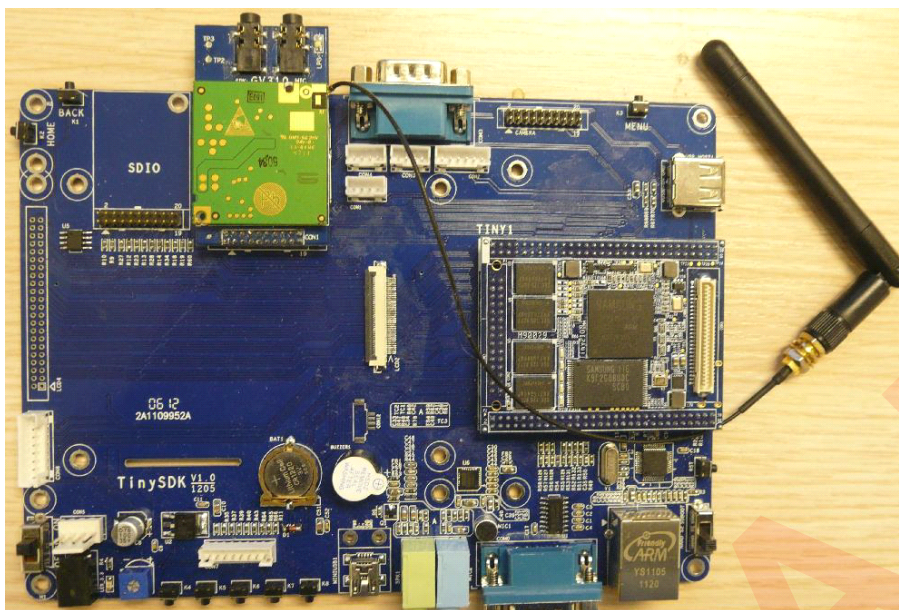
If you want to test the phone function, you can edit the filesystem as follow:

Notice: we have do the rootfs image for phone, if you don't want to edit the rootfs, only burn the rootfs filesytem with rootfs_android_phone.img

6.2.26.1 Configure the phone on Android 4

Enter the Android4 system on the board, then edit the /system/build.prop/system.prop for mini210 file with HyperTerminal by vi tools, do it as follow:

ro.sf.lcd_density=200

rild.libpath=/system/lib/libusb3gmodem-ril.so

rild.libargs=-d /dev/s3c2410_serial1

6.2.26.1 Configure the phone on Android 2.3.1

Enter the Android2.3.1 system on the board, then edit the /init.rc for mini210 file with HyperTerminal by vi tools, look for the follow line:

service ril-daemon /system/bin/rild -l /system/lib/libusb3gmodem-ril.so -- -d

/dev/s3c2410_serial1

service ril-daemon /system/bin/rild

Edit it as follow:

service ril-daemon /system/bin/rild -l /system/lib/libusb3gmodem-ril.so -- -d

/dev/s3c2410_serial1

6.3 Linux system Test

6.3.1 Calibrate Touch Screen

Note: if you cannot calibrate your screen by following the steps below, please delete "/etc/pointercal" and reboot or reinstall the whole system; or connect a USB mouse to your board, select "recalibrate" in "setting" to recalibrate your screen.

You will see the calibration interface under the following two situations:
After you follow the steps to install the Qtopia system and reboot the system, you will see the screenshot below. Follow the prompts on the screen to click on them and then click on the "+" signals.
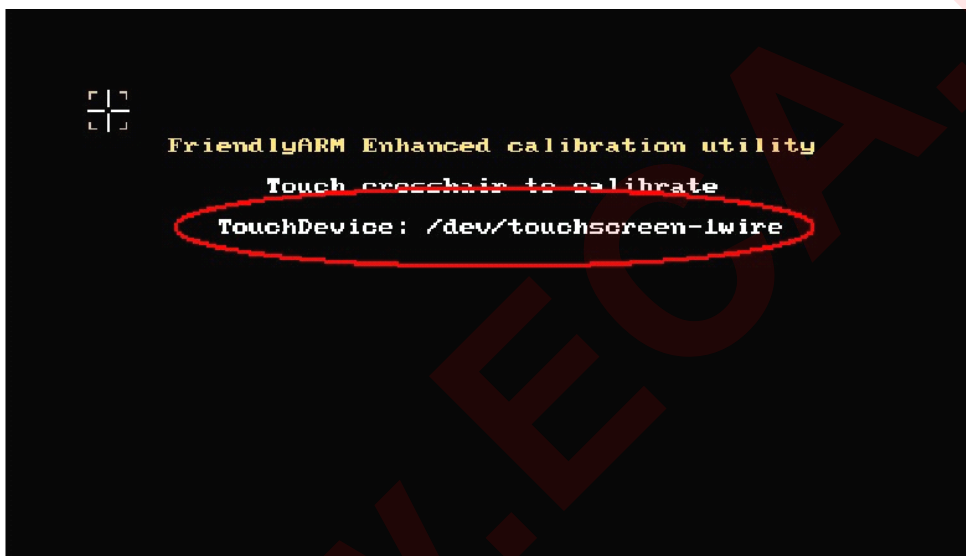
The statement red circled indicates that the system has the 1-wire precise touch device:/dev/touchscreen-1wire, if the ARM system has an integrated touch screen interface it will be "/dev/touchscreen"

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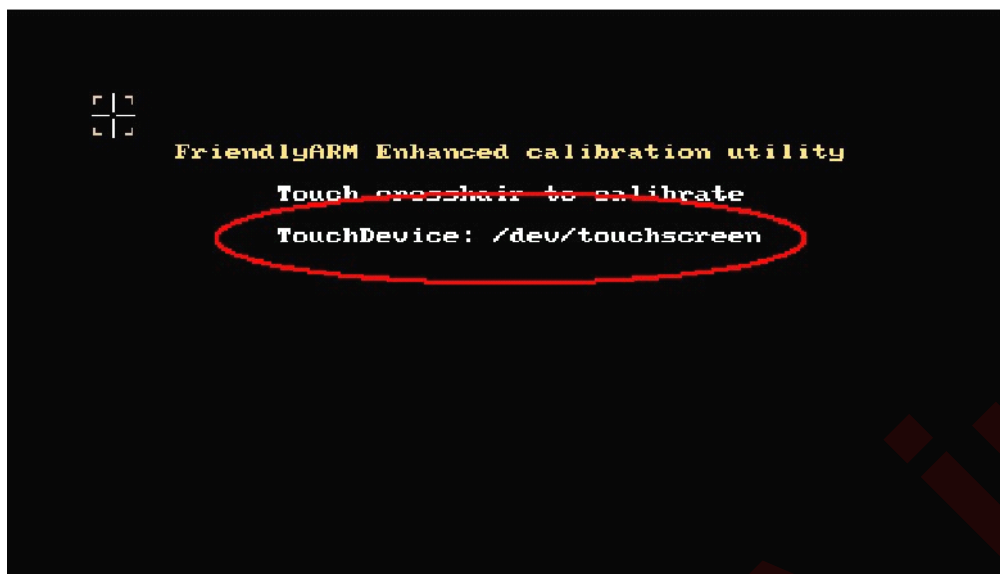
After entering the system, go to "Start" -> "Settings" -> "Configurations" -> "Recalibrate". Click on the "+" signal.
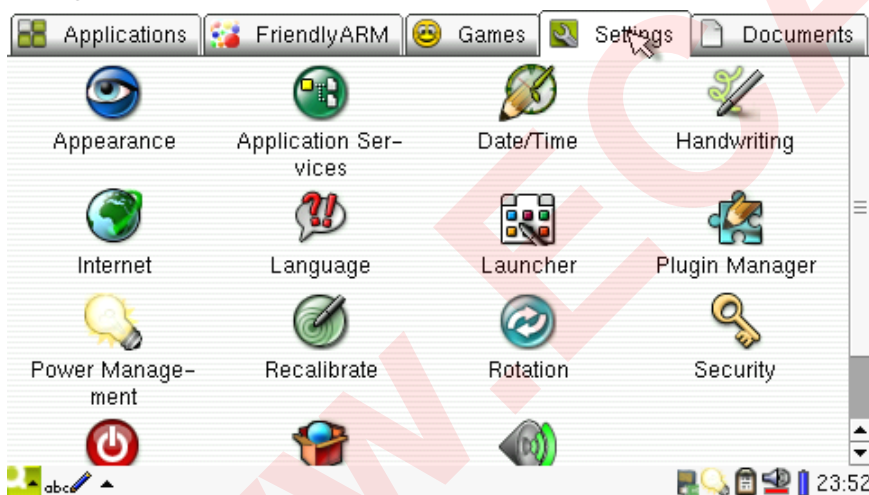
6.3.2 Main Interface

After entering the Qtopia system you will see the following screenshot:
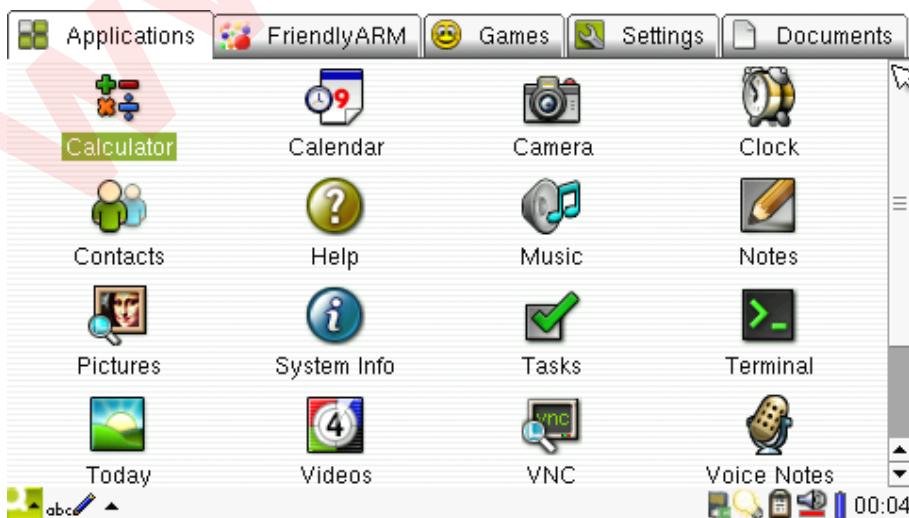
On top of the interface, you will see five icons, which represent five types of programs/files. Single click on anyone you will enter its sub-interface. All of these interfaces are very similar.

In addition, click on the "start" icon on the left bottom of the screen, you will see five sub-menus too, they are the same as the five ones on the top.

Among those programs, the ones in the "FriendlyARM" sub interface are developed or migrated by FriendlyARM. They are only for testing. All the other programs come with the system.
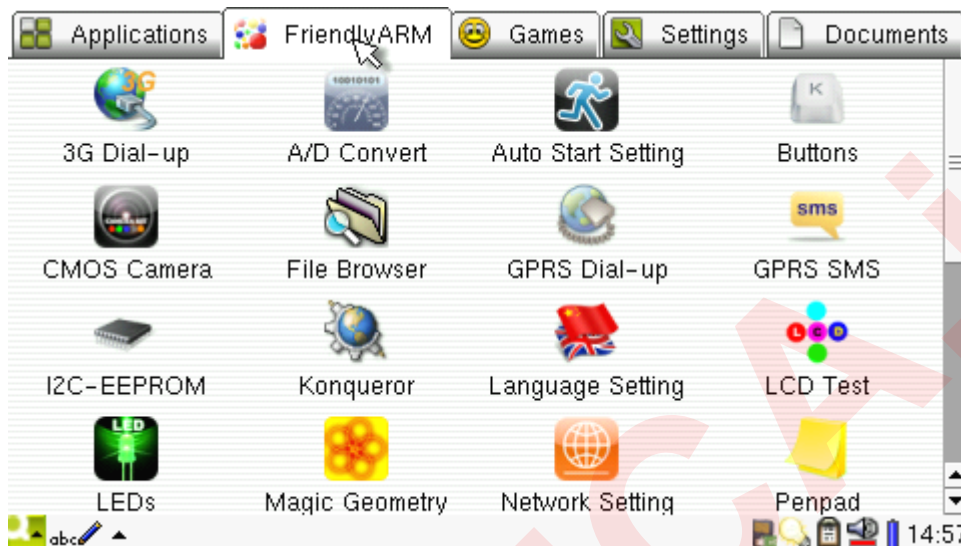
6.3.3 SMPlayer

MPlayer is an open source media player relying on various open source libraries which enable it to play varied video files and support video devices such as X11, Framebuffer, SDL, DFB. The version used in our system is based on Framebuffer.

MPlayer by itself doesn't have a GUI. There are many available GUIs such as SMPlayer, KMPlayer and KPlayer. We integrated SMPlayer into the Mini6410, which is based on Qt4.x libraries (we used the latest QtE-4.7.0) and upgrade it to a media player GUI. For more details please visit the following websites:

Mplayer's official website: http://www.mplayerhq.hu

SMPlayer's official website: http://smplayer.sourceforge.net/

The Linux kernel in our system has included a multi-media driver developed by Samsung. In order to make full use of the 6410 multi-media features we integrated MFC's application libraries into MPlayer. MPlayer in conjunction with SMPlayer is a very strong Linux media player. It can play both MPEG4 and H.264/H.263 files in 4.3"LCD, 7"LCD or monitors with higher resolutions elegantly.

In our shipped CDs there are several test video files for testing.

6.3.3.1 Play Video with SMPlayer

In the "FriendlyARM" tab, click on "SMPlayer"

Click on "Open" or to select a file you want to play (we use one in "sdcard")
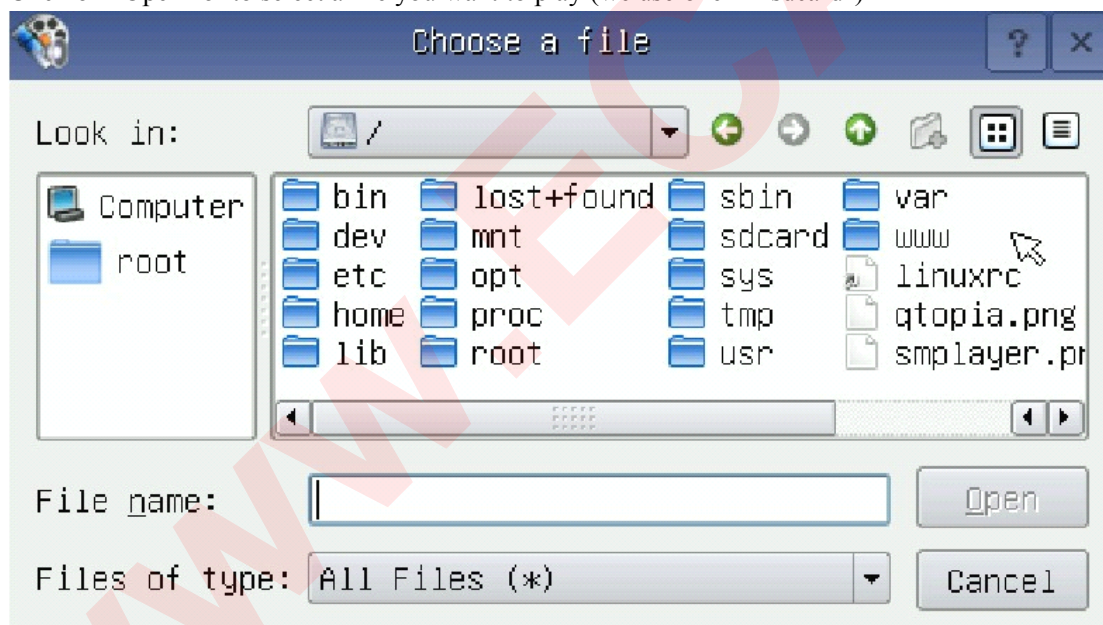
Locate a file and double click on it to select or click on it and "open"
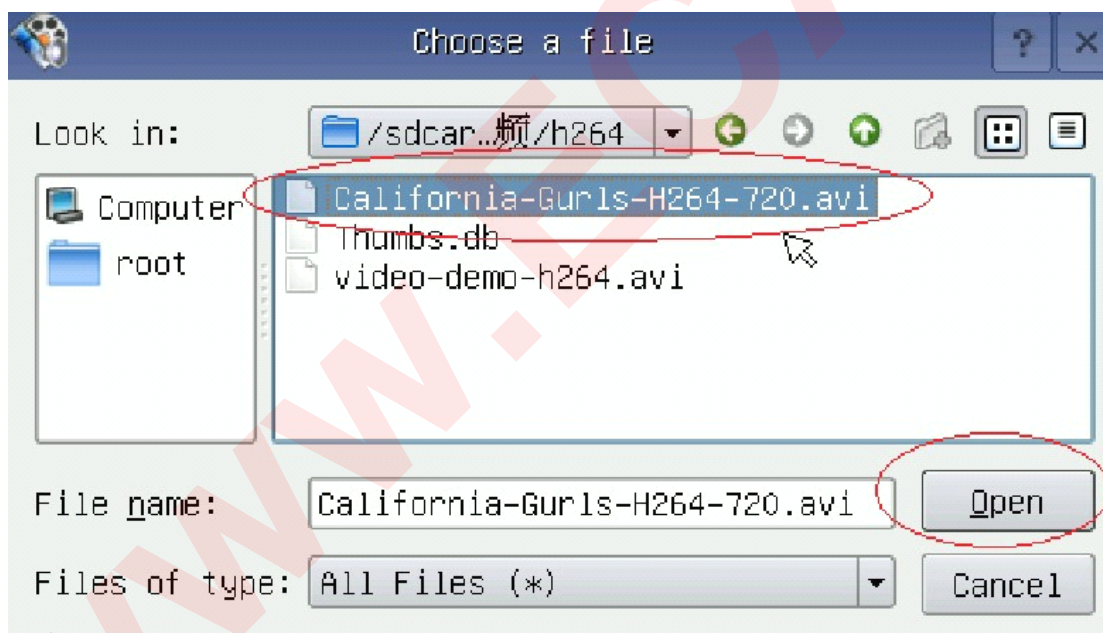
Now you can enjoy your video:

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When it is playing you can click on the screen to pause it and return to the main menu

In the main menu you can adjust the volume, speed, or zoom in/out. Click on the icon on the upper right or go to "Open-Quit" to quit the application and return to Qtopia2

Note: in the first 5 seconds, a logo "FriendlyARM" will be displayed on the upper left of the screen, suggesting it is developed by us. If you want to customize your player please contact us.

6.3.3.2 Output HDMI to TV

It is turned on the HDMI output to the TV in Linux system by default, turn on the TV and plug in the HDMI cable, the image will be synchronized output to the LCD and TV.

With HDMI, we can output image to the TV (or monitor)directly but no need to connect LCD.TV is not with touch screen,so you need to modify FriendlyARM.ini , add skipcali = yes behind the Linux-Command Line value to skip the touch screen calibration, and then operate by USB mouse. If you want to turn off the HDMI output, or update the HDMI resolution, ,click the icon of the HDMI in

the "friendly arm" program group,enter the HDMI setup program, cancel the setup program "Auto the start the HDMI-output on the boot", select the resolution in the list you want to set,then click Save.

HDMI settings are in settings file: / root / Settings / HDMI.conf .User can pre-configure it before production.
[HDMISetting]
AutoStart = yes
Resolution = 720P-60Hz
SupportResolution1=720P-60Hz
SupportResolution2=1080I-50Hz
…

AutoStart is whether synchronized output HDMI after booting (default value is yes) Resolution is HDMI resolution,Optional values are as follows ：
1080P-60Hz
1080P-50Hz
1080I-60Hz
1080I-50Hz
720P-60Hz
720P-50Hz
576P-50Hz-16:9
576P-50Hz-4:3
480P-60Hz-16:9
480P-60Hz-4:3
SupportResolution1 ~ SupportResolutionN is the values written by the back-platform service,and return the resolution connected TV successfully .
HDMI   back-platform service is hdmi-service, it start by calling hdmi-service autostart. in the / etc / init.d / rcS

6.3.4 HDMI Output without LCD

You can update the system with the follow param in the friendlyARM.ini file, then it can support more HDMI resolution output.
More update the system moethod, please refer to the chapter 2.

```
#This line cannot be removed. by FriendlyARM(www.arm9.net)

CheckOneButton=No
Action = Install
OS =Linux
LCD-Mode = No
LCD-Type = HDMI720P60
LowFormat = Yes
VerifyNandWrite = No
```

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CheckCRC32=No
StatusType = Beeper | LED

################### Linux ####################
Linux-BootLoader = Superboot210.bin
Linux-Kernel = Linux/zImage
Linux-CommandLine = root=/dev/mtdblock4 console=ttySAC0,115200 init=/linuxrc skipcali=yes
Linux-RootFs-InstallImage = Linux/rootfs_qtopia_qt4.img

  It can support the follow param for the LCD resoulution.

LCD-Type	Resolution	TV Resolution	
HDMI1080P60	1920x1080	1920x1080	
HDMI1080I60	1920x1080	1920x1080	
HDMI1080P30	1920x1080	1920x1080	
HDMI1080P60D	960x536	1920x1080	Andorid4 not support
HDMI1080I60D	960x536	1920x1080	Andorid4 not support
HDMI1080P30D	960x536	1920x1080	Andorid4 not support
HDMI720P60	1280x720	1280x720	
HDMI720P60D	640x360	1280x720	
HDMI576P16X9	720x576	720x576	
HDMI576P16X9D	720x576	720x576	
HDMI576P4X3	720x576	720x576	
HDMI576P4X3D	720x576	720x576	
HDMI480P16X9	720x480	720x480	Andorid4 not support
HDMI480P16X9D	720x480	720x480	Andorid4 not support
HDMI480P4X3	720x480	720x480	Andorid4 not support
HDMI480P4X3D	720x480	720x480	Andorid4 not support

6.3.5 Play MP3

Go to the "Applications" tab and click on "Music" to start a player. In the "Audio" list you
can select an MP3 file and "play".
Note: files listed in "Audio" can all be viewed in the "Documents" tab. You can go to the "Documents"
tab and play it there.

6.3.6 Play Video

Go to the "Applications" tab and click on "Video". In the "Video" list you can select a video file and play.
This player is integrated in Qtopia it can only do soft decoding thus couldn't play H.264/H.263/Mpeg4.
Note: files listed in "Video" can all be viewed in the "Documents" tab. You can go to the "Documents"
tab and play it there.
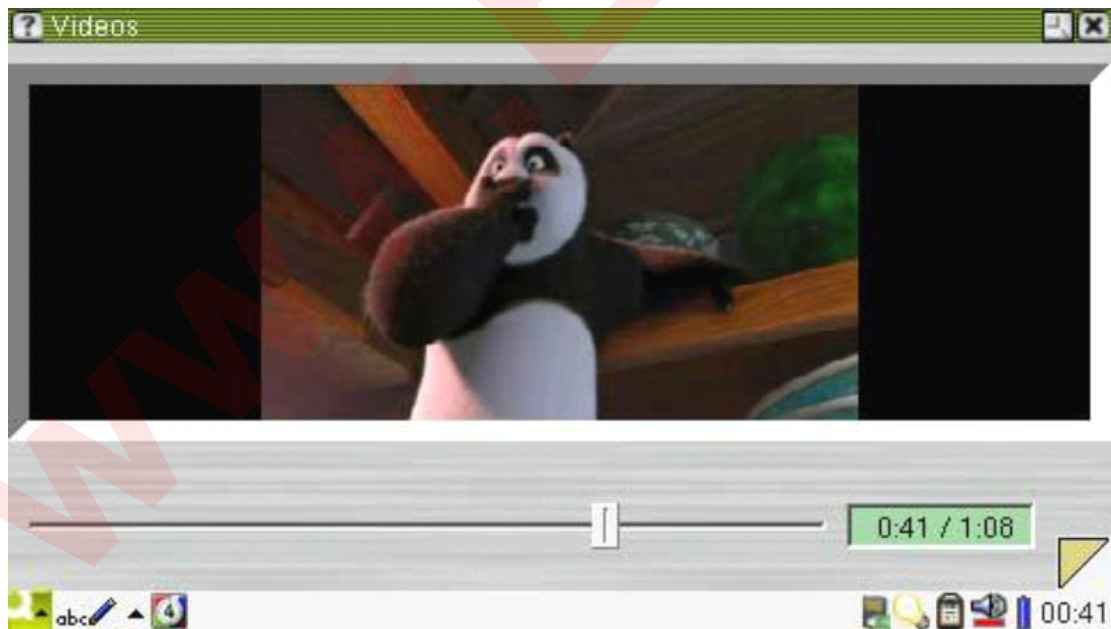
6.3.7 View Pictures

Go to the "Applications" tab and click on "Pictures". You will see the icons of these pictures in
"Documents".If you have a SD card or flash drive mounted pictures in it will be listed too.

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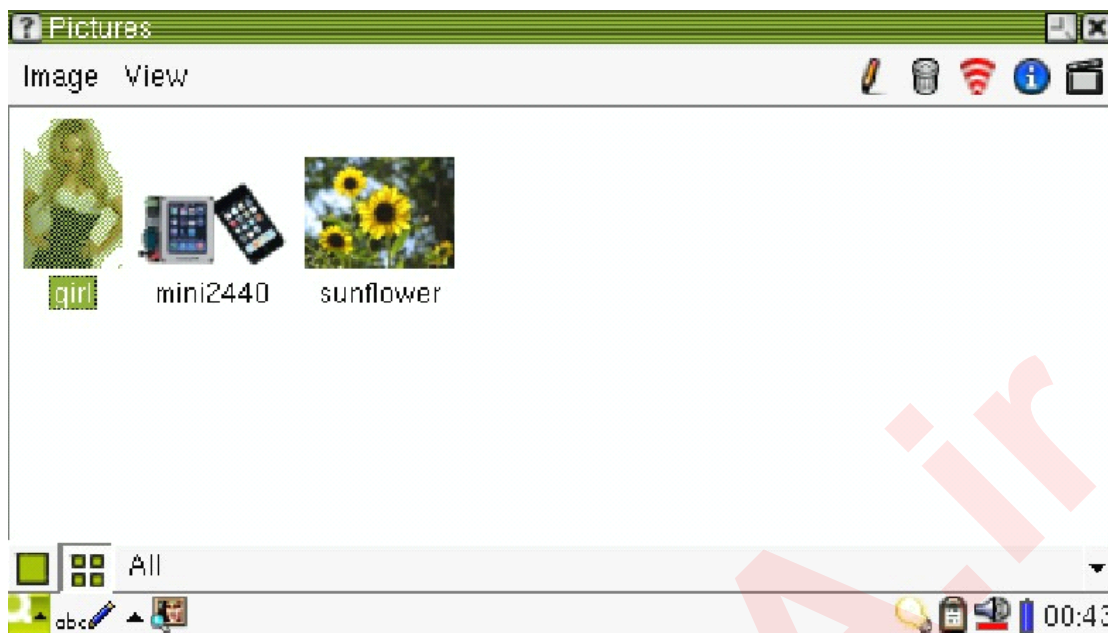
Qtopia 2.2.0 has an image viewing utility which is better than the one in Qtopia 1.7.0 and users can use it to edit images.

6.3.9 Auto-Mount SD Card/Flash Drive

Insert a common or high speed SD card (max memory 32G) or a USB flash stick, moments later a small icon will pop up on the lower right of the screen. The Tiny210 supports simultaneous mounting of the two. Click on the icon you will see the screenshot below, you can remove it safely like what you can do in Windows

All files in the MMC/SD card or the flash drive can be viewed in the "Documents" tab. Their directories will not be displayed.

Auto mounting of a MMC/SD card or a flash drive is developed by FriendlyARM based

on a Qtopia 2.2.0 plugin. Now this function can only recognize the first section and can only recognize VFAT/FAT32/FAT16.

Files of other formats may not be recognized correctly.

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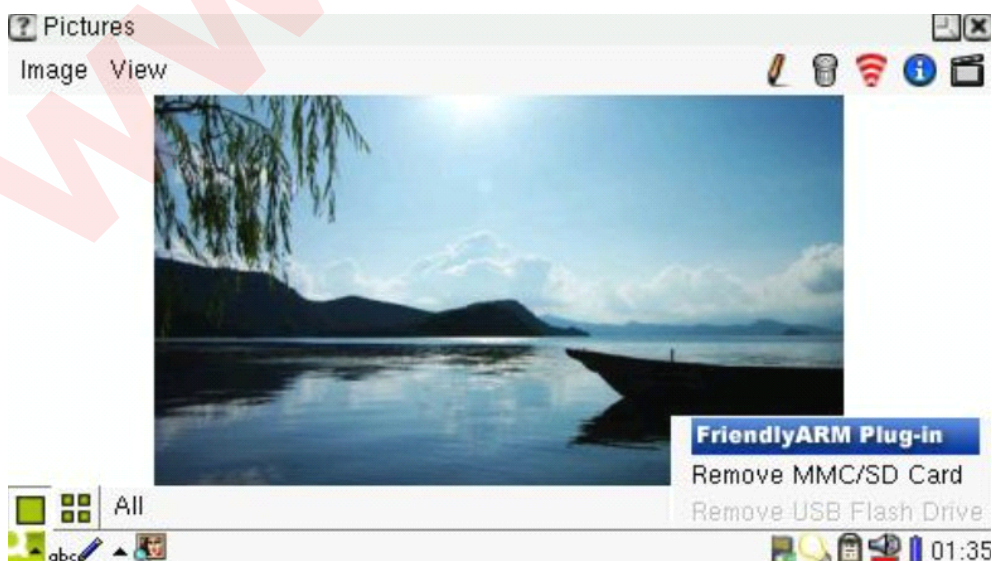
Click on "Applications -> System Info -> Storage" you will view your SD card or flash drive's detailed memory information:
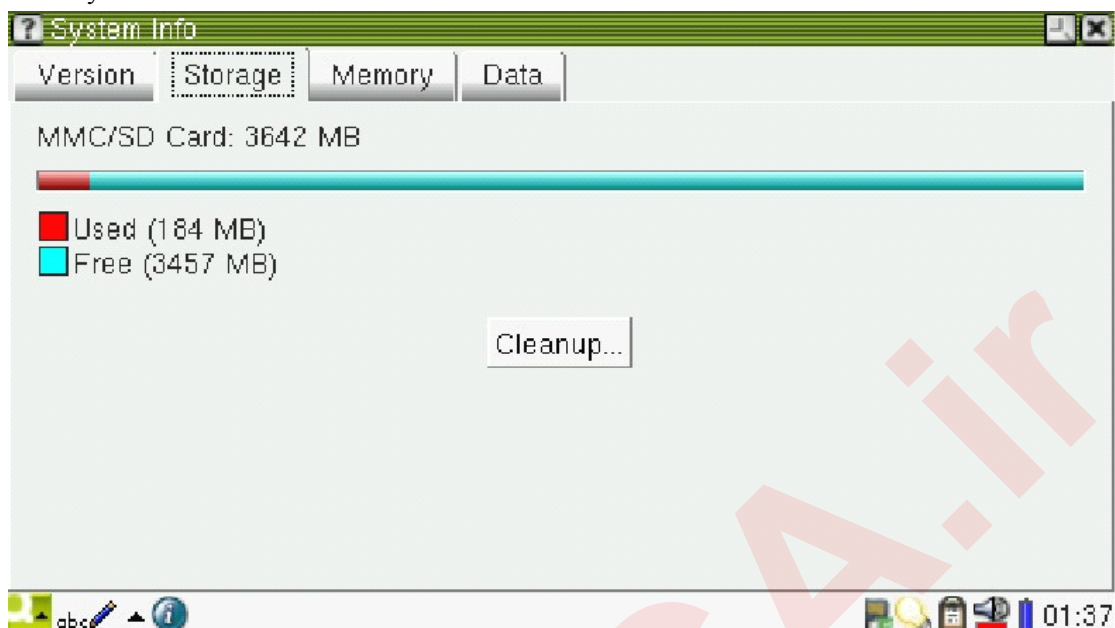
6.3.10 Calculator

Go to the "Applications" tab and click on "Calculator". You can configure your calculator to different types by selecting "Simple", "Fraction", "Scientific" and "Conversion".

6.3.11 Terminal

A terminal is a widely used interactive interface in Linux. Users type commands in a terminal to operate the system. You can set up or open a terminal in various ways:

On system startup, if a terminal is bound to the serial port all its outputs and inputs are to and from this serial port. This is a common Linux way.

On system startup if a terminal is bound to a graphic device (such as LCD or CRT) and the keyboard is

set to the input device then an independent input/output system will be established.
When a graphic device is connected and a GUI is integrated a GUI based "command
terminal window" will be established. Users can interact with the system either via a keyboard or a "soft
keyboard". The latter is what we will talk about.
Go to the "Applications" tab and click on "Terminal". You can either connect a USB
keyboard (connect the USB keyboard after system is up) or type on the "soft keyboard" to input your
command. You can customize it by clicking on the "Option" menu to set up more configurations.
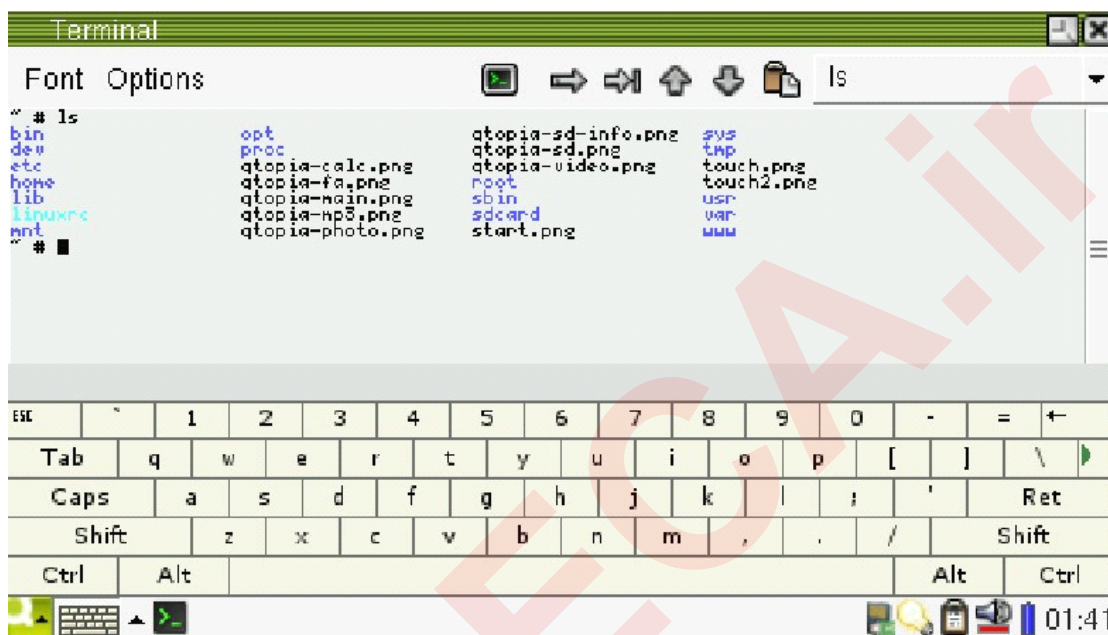
6.3.12 Manage Files

Go to the "FriendlyARM" tab and click on "File Manager".
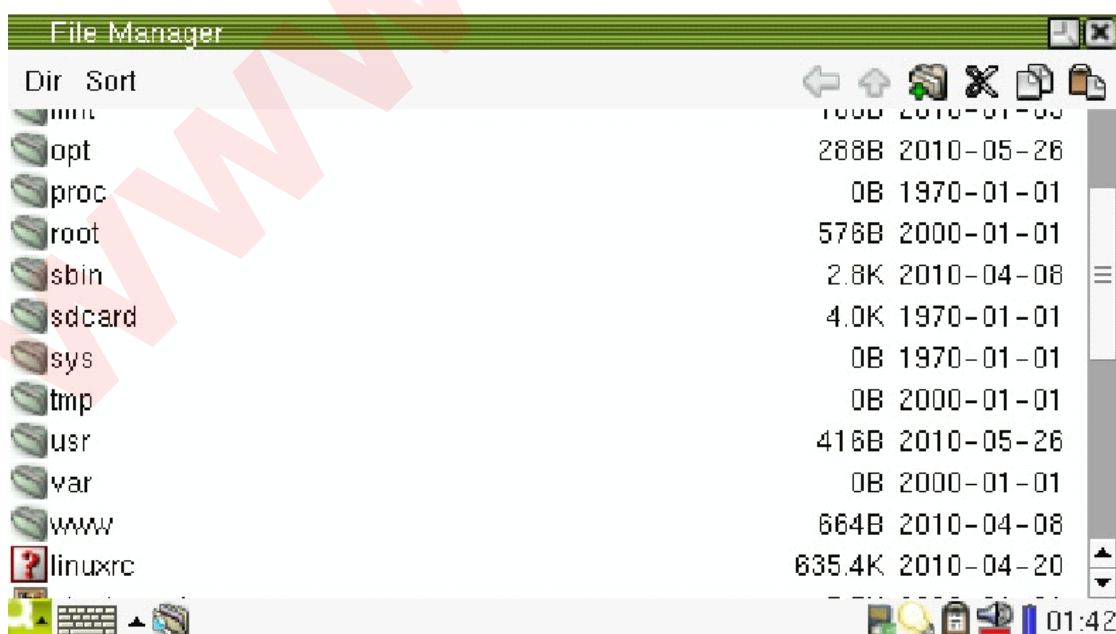
You can browse and manage files and directories
Note: Qtopia-2.2.0 doesn't have this manager, we migrated the one from Qtopia-1.7.0. They have

identical functions and interfaces.

6.3.13 Set up Network

Go to the "FriendlyARM" tab and click on "Network Setting":
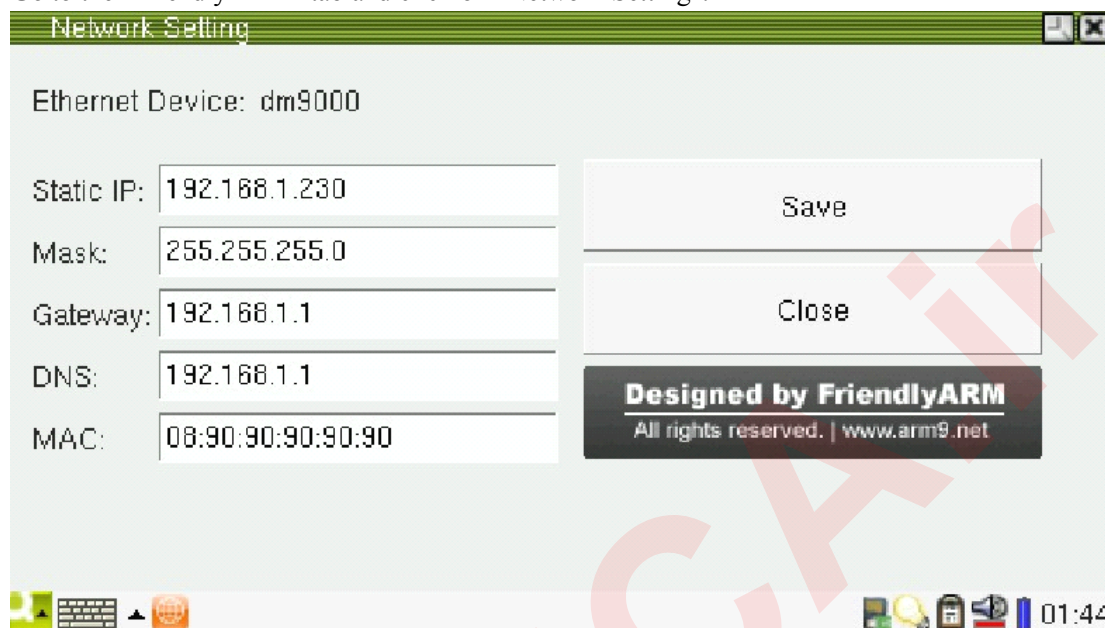
From this interface we can set various network parameters:

l   Static IP address, default setting is 192.168.1.230

l   Mask, default setting is 255.255.255.0

l   Gateway, default setting is 192.168.1.1

l   DNS, default setting is 192.168.1.1

l   MAC address, default setting is 08:90:90:90:90:90

Click on "Save" to save these parameters and they are effective right now. After rebooting the system, these settings will still be there. The configuration file that contains the settings is "/etc/eth0-setting". Note: the "/etc/eth0-setting" file will not exist after reinstalling the system. Clicking on the "Save" button will generate one. Because all products are tested extensively by us, this file exists in your system. Executing the "ifconfig" command will not change this file. In fact, Qtopia has a network setting utility by itself. But its interface is too complicated and may not work sometimes. We didn't make any change to this utility however created another one shown above.

6.3.14 Set up WiFi

This section will guide to through the steps to set up WiFi. The TINY210 supports SD-WiFi module and most of the popular USB WiFi cards:

6.3.14.1 Start WiFi Utility

Go to the "FriendlyARM" tab and click on "WLAN Setting"

6.3.14.2 Search for and Connect to Wireless AP

After the WLAN Setting utility is started it will automatically search for wireless AP and list their SSIDs and signal strength. If your utility doesn't show sources please click on "Scan"
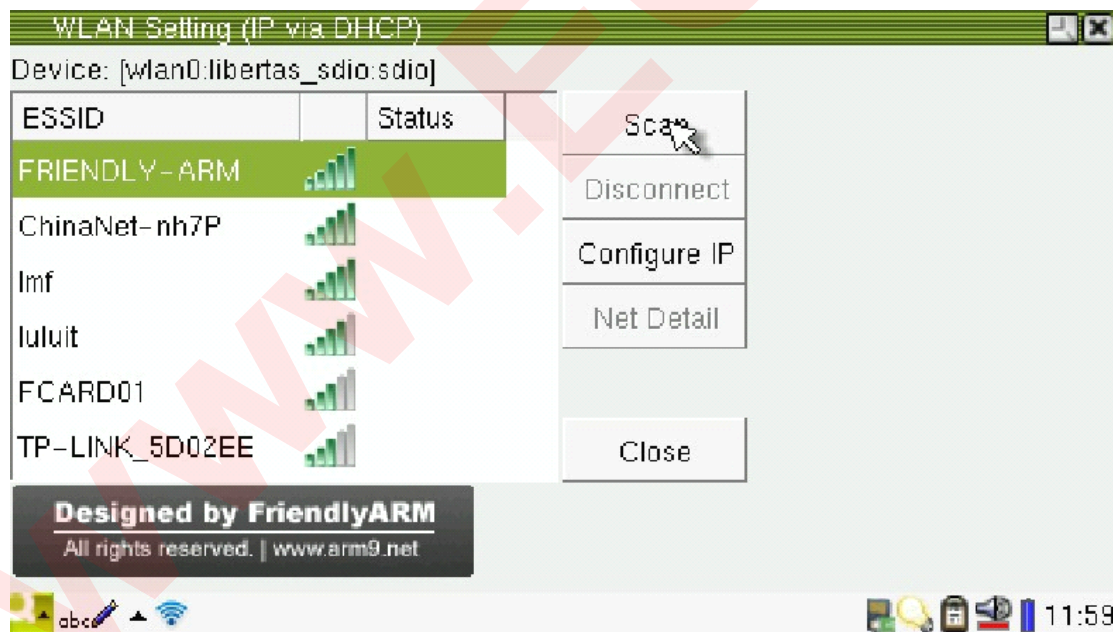
After an AP is found click on its SSID to connect. The following dialog will pop up and you need to input its password:
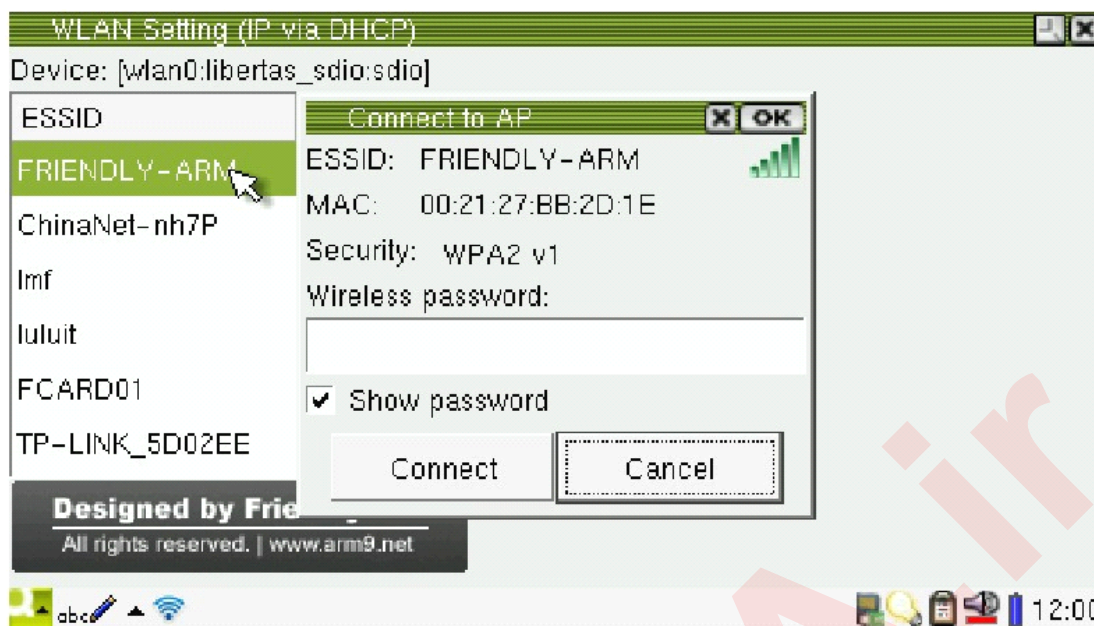
After typing the password (leaving it as blank if no password is set) click on "Connect"
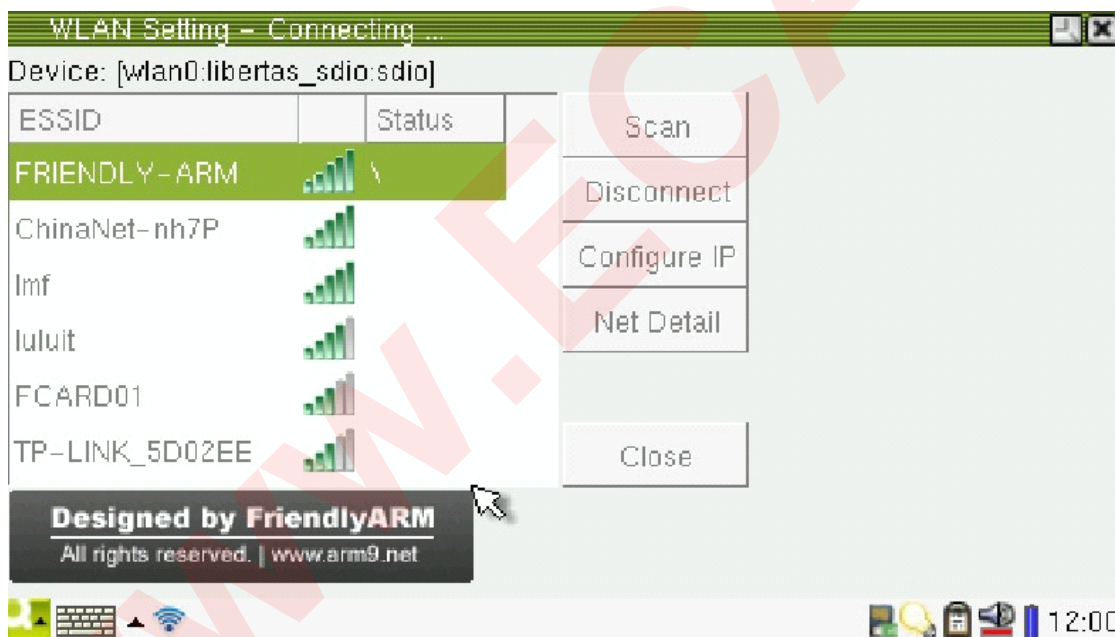
If the connection is successful, its status will show "connected"

If your Ethernet is connected the following dialog may pop up asking you to disconnect it (ifconfig eth0 down) otherwise some network utilities would connect the Ethernet rather than the WiFi. Clock on "Yes" to close it. To reconnect it you can either start "Network Setting" or type "ifconfig eth0 up".
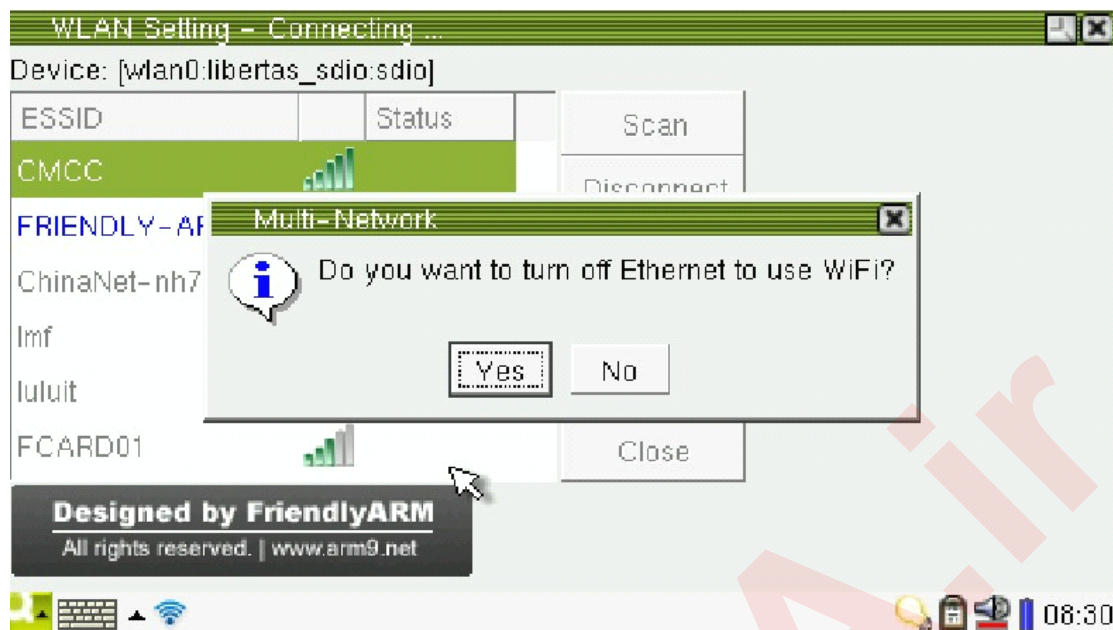
Click on "Net Detail" to view more detailed network information such as IP, DNS and so on.
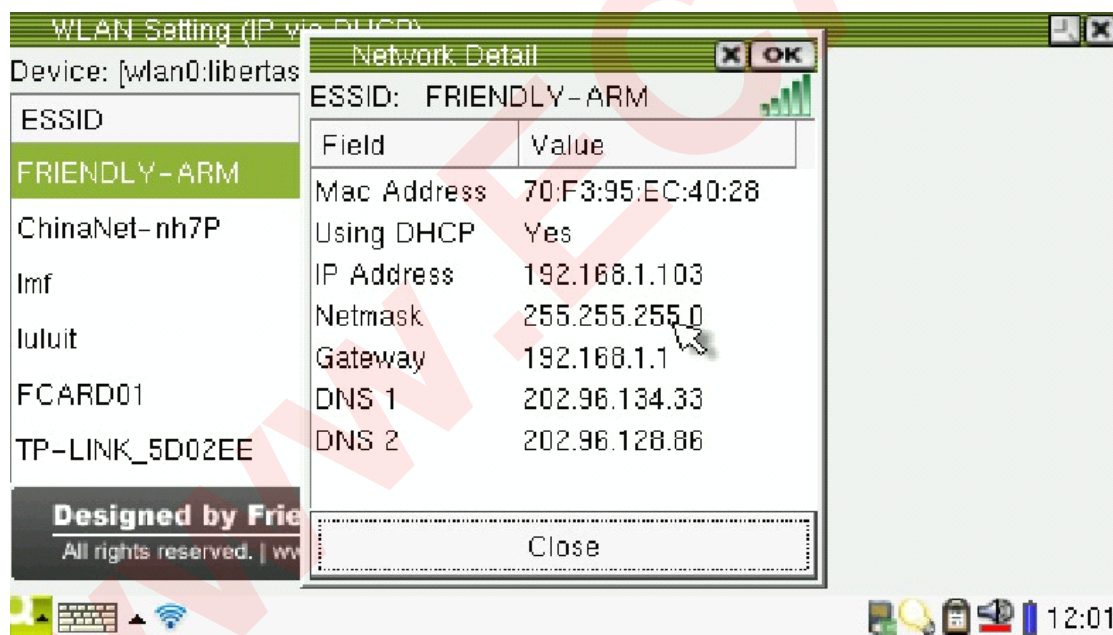
If the WiFi connection is a success, you can minimize its GUI to a small icon by clicking on the "Close" button. To restore its GUI you can click on the small icon

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Now you can try your WLAN
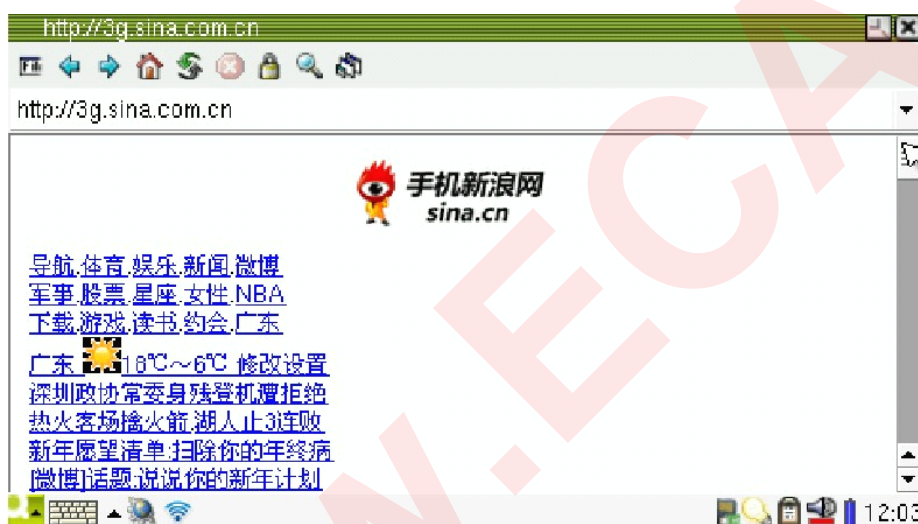
6.3.14.3 Disconnect WiFi

In the main menu click on "Disconnect" to disconnect the WiFi connection
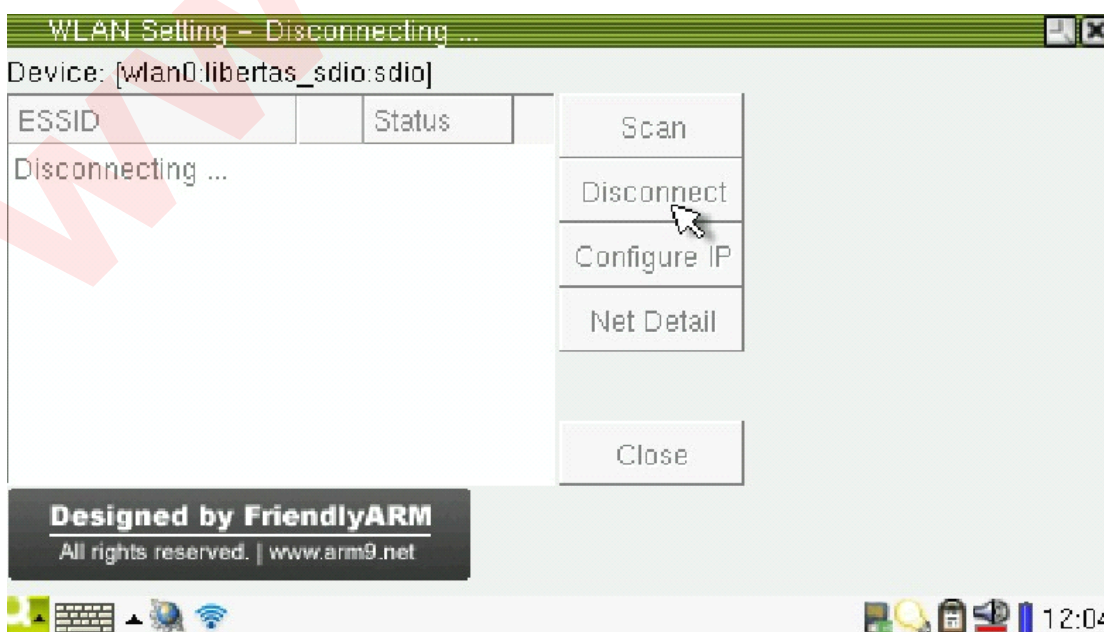
6.3.14.4 Configure Static IP Address

In the main menu, click on "Configure IP" to start the IP configuration interface:
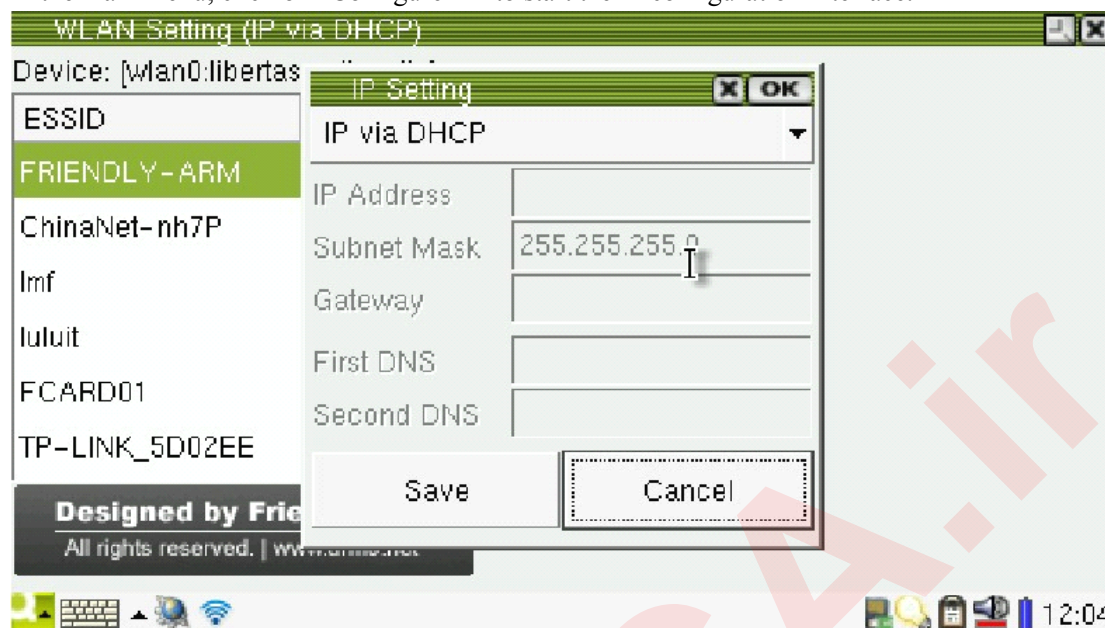
Click on the pull down menu you will see two options: "IP via DHCP" and "Configure IP manually"
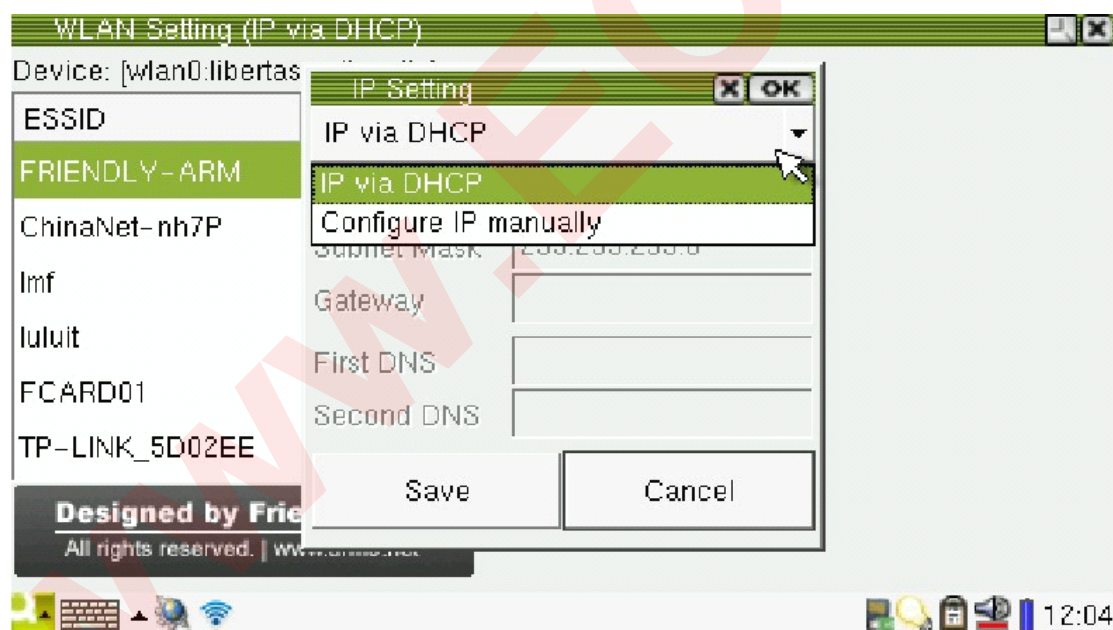
After configuration is done, click on "Save" to keep your settings

6.3.15 Ping Test

Connect your board to a network, set up your network and you will be able to test PING. Go to the "FriendlyARM" tab and click on "Ping Testing".

فروشگاه تخصصی برق و الکترونیک
شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲
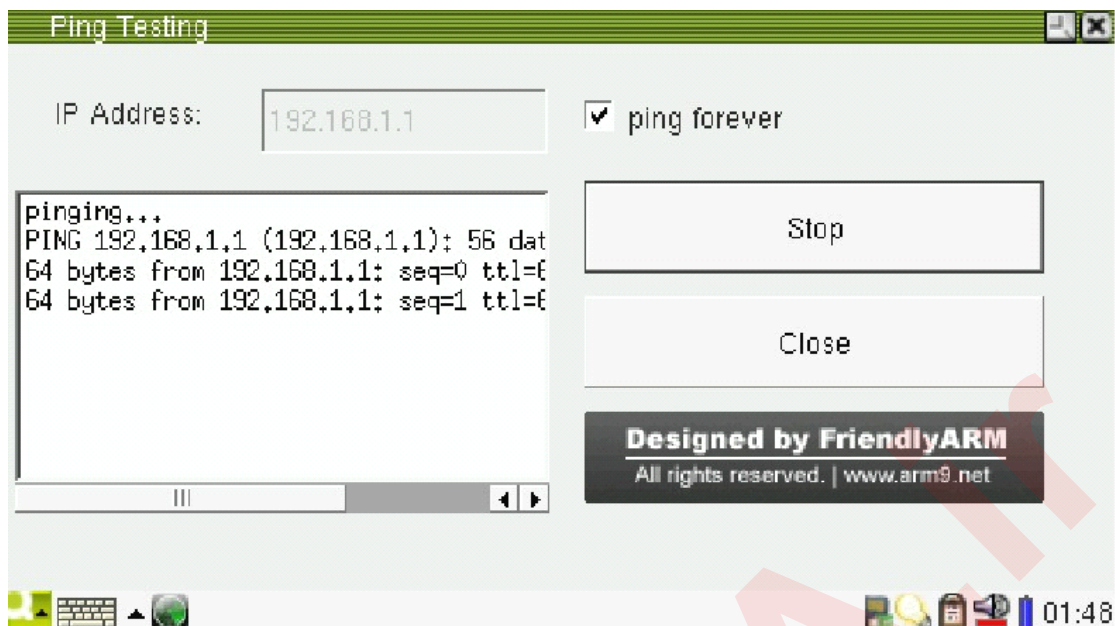
Start" to ping and "Stop" to stop it. To shutdown the ping utility you need to stop it first.

Note: PING is a common network testing utility. All Linux versions and MS Windows have this utility. The PING utility actually calls the ping command and output its result in the GUI.

6.3.16 Web Browser

Go to the "FriendlyARM" tab and click on "Browser". Click to start the "soft keyboard" on the lower right of the screen, type a website and click on "Ret" on the keyboard you will be able to visit your website.

Note: the browser utilized in the Mini6410 is Konqueror/Embedded, which is open source

6.3.17 LED Test

Go to the "FriendlyARM" tab and click on "LED Testing".

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شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲۰

6.3.18 IIC-EEPROM Test

Go to the "FriendlyARM" tab and click on the "I2C-EEPROM" icon to open the interface. Open the "soft keyboard" on the task bar, write some characters in the write area, click on the "Write Data below into EEPROM via IIC" button, the button will change to a process bar indicating the writing process.
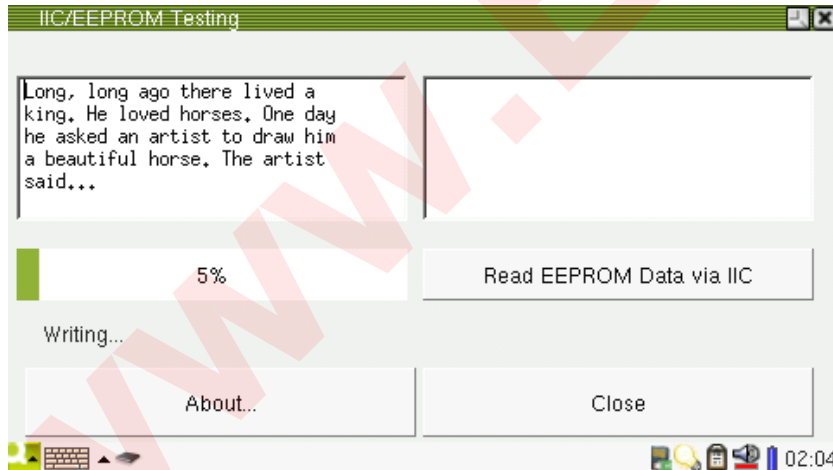
Click on the "Read Data via IIC" button, it will change to a process bar too indicating the reading process

V1.0
                                                                   CoreWind Technology Co.,Limited
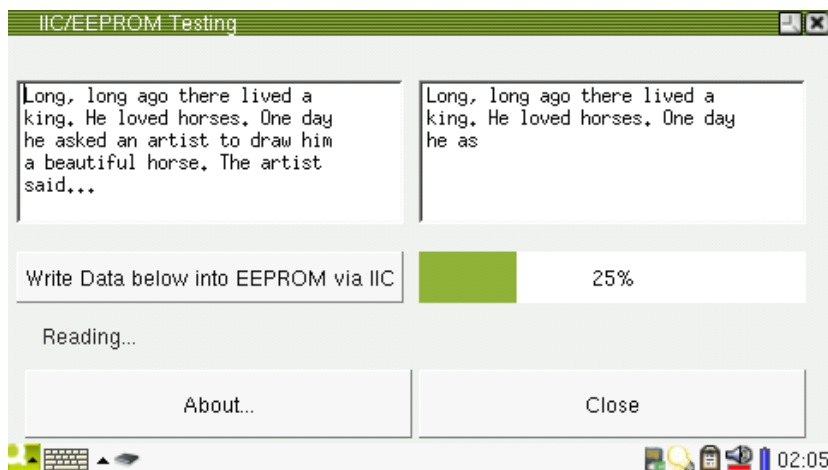
6.3.19 PWM Buzzer Test

Go to the "FriendlyARM" tab and click on the "PWM/Buzzer Testing" icon to open the interface.
By default, the output frequency of PWM is 1000Hz. Click on the "Start" button, the buzzer will beep.
Clicking on the "+" or "-" button will change its frequency and sound as well. Clicking on the
"Stop" button stops the buzzer
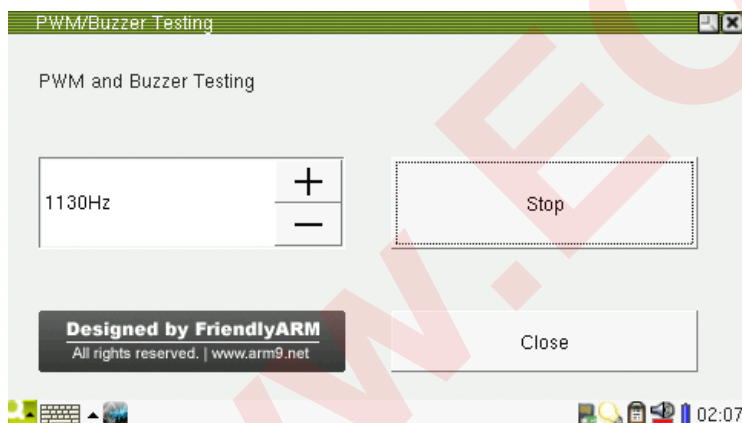
6.3.20 Serial port Test

Note: before start this program please connect the serial port your want to test to your board.
- The on board CON1, 2, 3 and 4 are CPU UART0, 1, 2 and 3. UART0 has been converted to
RS232, and extended to COM0 via DB9. On system startup it has been set to the console terminal, so it
cannot be tested via this utility. The other three ports CON2, 3 and 4 must be converted to RS232 before
they can communicate with a PC serial port. (FriendlyARM has a "OneCom" RS232 conversion module)
When connect the ports to a PC, please make sure to use a correct serial cable (cross serial line or direct
serial line).
- This program also supports common USB to Serial cables. Now most laptops don't have serial ports.
For the sake of users most of our agents provide those conversion cables. Connecting a USB to Serial
cable to your board, you can extend your serial ports. Its device ``` name generally is "/dev/ttyUSB0, 1,
2 and 3", which implies you can us
e a USB hub to extend your serial ports.
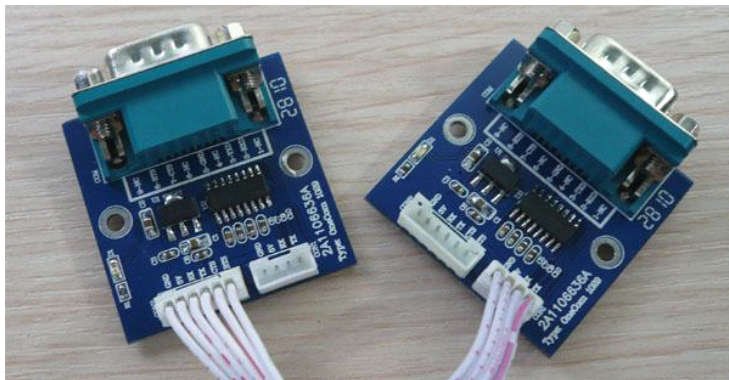
Connect your serial port extension board to the Mini6410's CON2/3/4 and connect to a PC via a crossover serial cable.

Go to the "FriendlyARM" tab and click on the "serial port assistant" icon to open the interface.
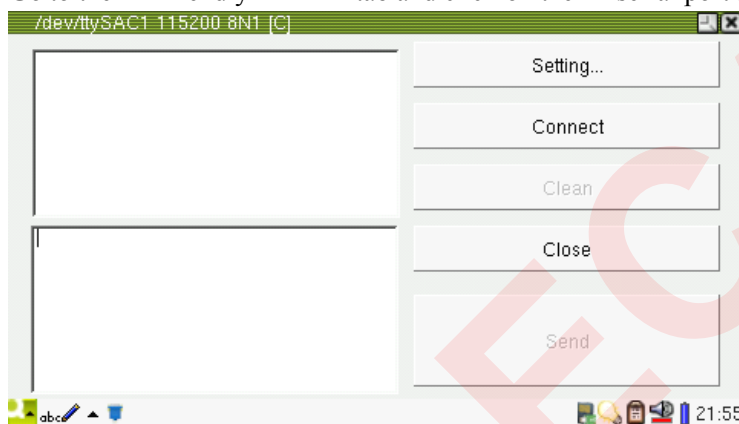
The title bar of the utility shows the default setting is "ttySAC1 115200 8N1 [C]", and it implies the default port is:

- Serial Port Deivce: /dev/ttySAC1, it corresponds to the second port UART1
- Bits Per Second: 115200
- Data Bits: 8
- Flow Control: None
- Stop Bits: 1
- [C]: stands for the character mode; [H] stands for Hex

There are two edit areas in the interface, the top one shows received data which cannot be edited; the bottom one shows sent data which can be edited via a USB keyboard or a soft keyboard.

Click on the "Connect" button to open "/dev/ttySAC1", type some characters in the edit area, click on the "Send" button and it will send data to the connected serial port device. The screenshot below shows what a Windows super terminal receives (Note: the settings for this super terminal should be 115200 8N1)
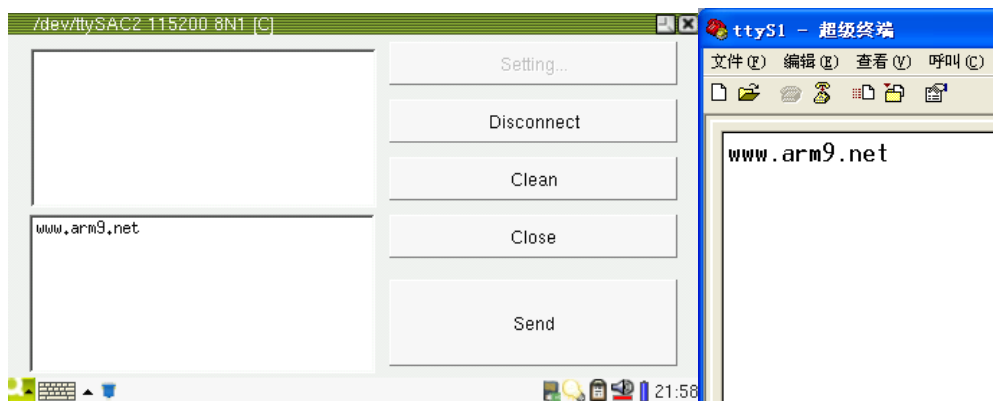
Click on "Disconnect" to disconnect the connection. Click on "Setting…" to enter the parameter setting interface which lists some basic serial port parameters:

Comm Port: you can choose "/dev/ttySAC0,1,2" or the USB to Serial "/dev/ttyUSB0,1,2,3". Note: in this utility, SAC0 corresponds to CON1, SAC1 corresponds to CON2 and etc.

Speed: bits per second

Data: data bits, 8 or 7, usually 8.

Hex: input and output data in Hex format.

6.3.21 GPRS Modem Test

You can connect to the internet via common a GPRS modem. Our shipped package includes a GM2403 modem which incorporates Wavecom's industrial Q2403A module and supports GSM/GPRS 900M/1800M. For more details please refer to its manual.

You can connect to a Modem via either a serial cable or a USB cable.

(1) Connect via Serial Cable

To Connect a GPRS modem via a serial cable you need a four-wire serial cable (also called five-wire cable and the fifth is grounded): TXD，RXD，CTS and RTS. The Mini6410's first serial port is four-wired however it is reserved for the console terminal; the second serial port is four-wired too which corresponds CON2 (whose device name is /dev/ttySAC1) and is TTL. We need to convert it to RS232 before it can be connected to a Modem. You can use our offered serial conversion board (model:OneCom2) or make your own

Note: when the dialing utility is operating the serial device it will set CTS and RTS. This operation is necessary. Using a serial port that has CTS/RTS ensures integrity and security of transmitted data.

(2) Connect via USB to Serial cable

If you don't have a conversion board mentioned above you can use a USB to Serial connector too. Our

kernel supports most of the popular USB to Serial connectors which supports all serial functions including CTS and RTS

Note: after a USB to Serial device is inserted, you will find a new device "/dev/ttyUSB0" or "/dev/ttyUSB1" listed in the "/dev" directory

Go to the "FriendlyARM" tab and click on the "GPRS Dialing" icon you will see a configuration dialog pop up. If You are using your CON2 conversion board you need to select "/dev/ttySAC1" and select "/dev/ttyUSB0" if you are using a USB to Serial convertor.

We select /dev/ttySAC1 and click on OK to continue.
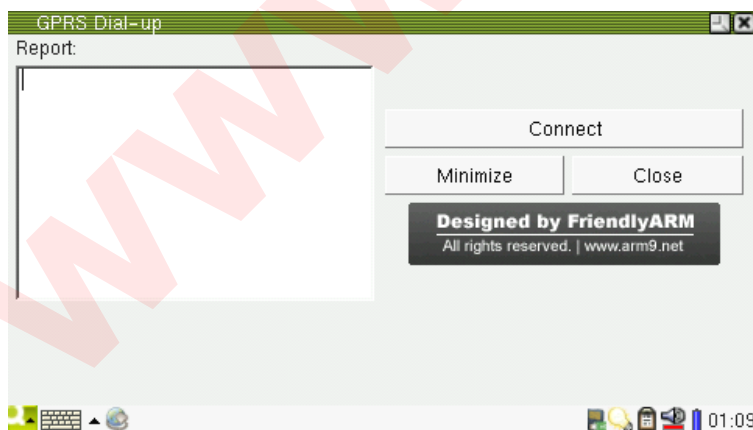
The dial up window is straightforward and you just click on "Connect" to begin dialing. After it is successful it will show an allocated IP and DNS.
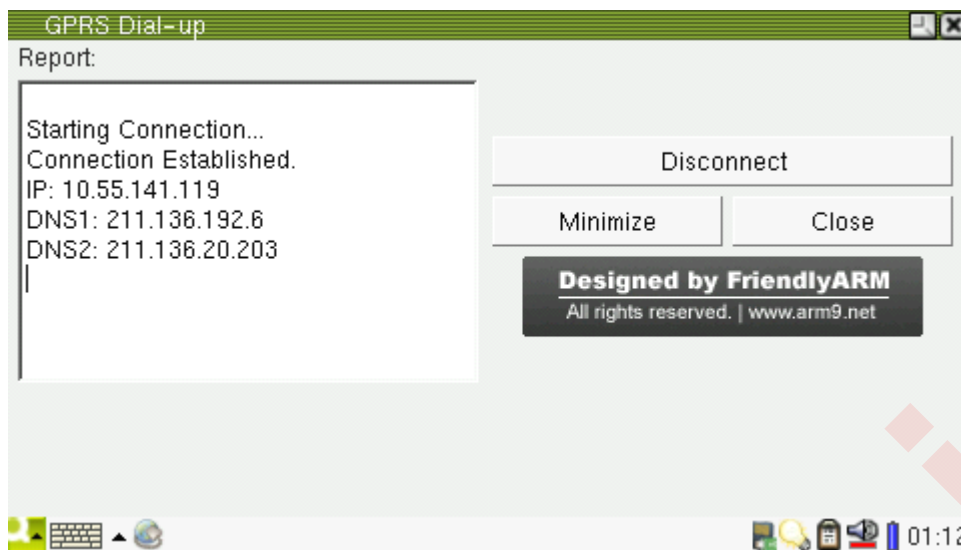
Clicking on "Disconnect" closes the connection. Clicking on "Minimize" minimizes the window. We usually minimize it and start a browser to surf the internet.

6.3.22 Single/Group-Send Messages via GPRS Modem

Please go to "FriendlyARM" and click on "GPRS SMS"

If the connection is a success, the status will show "Ready". Occasionally it shows "Device Initing…"
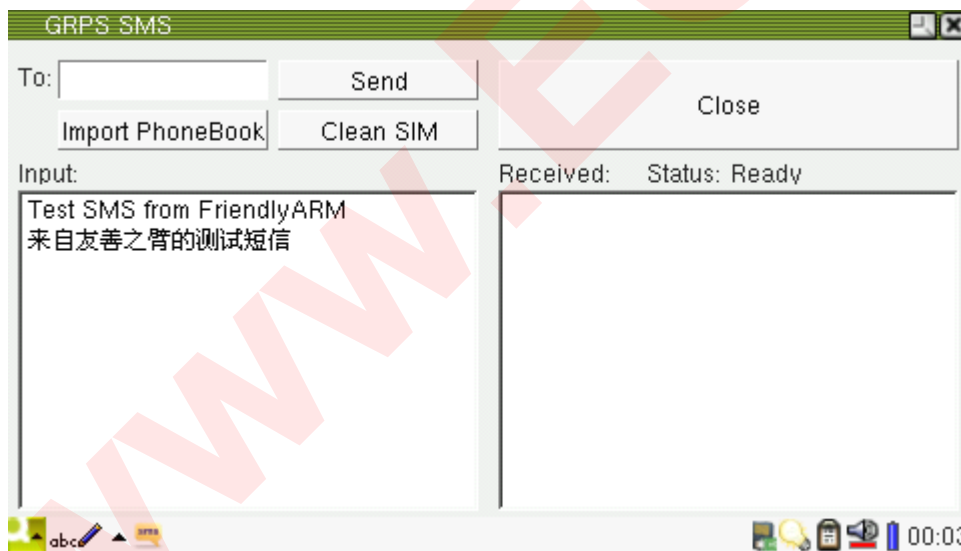
and this suggests that the previous shutdown was an abnormal operation or the previous Modem connection wasn't disconnected or your connection isn't good. We recommend users to use a USB to Serial convertor to connect a Modem.

(1) Single sending messages

Please input your target cell phone number in the edit box on the right side of "To:", type your message in the edit box below "Input" and click on "Send".

If the sending is a success and the telecommunication service provider sends back an acknowledgement you will see the "Status" shows "Get SMS OK".

You can send messages to your own cell phone for testing too
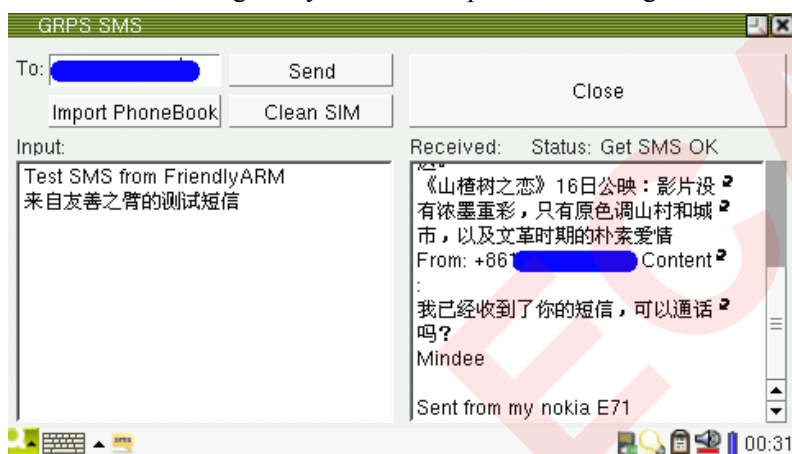
The format of the cell phone number varies in different countries:

In mainland China it is "+8613800138000" or "13800138000".

On Abroad you need to add a country code prior to the number e.g. "+4423645789". The

number after "+" composes of the country code first and the cell phone number then.

Note: there is no Chinese input utility in the system therefore if you want to send message in Chinese

you have to copy and paste it from elsewhere.

(2) Group sending messages

To group send messages you need to edit a "phonebook.txt" and it should be in the root directory of the

SD card. Note: the name of the file cannot be changed. Its contents could be as follows:

Mindee

13800138000

Mike

13800138000

Jason

+8613800138000

Names can be ignored:

13800138000

13800138000

+8613800138000

Insert your SD card, click on "Import Phonebook" to import your phonebook, click on "Send" and

your messages will be sent out.

Note: this utility itself doesn't save your received messages. Your messages will be saved in your SIM card. If your card is full, you need to "Clean SIM" to remove your obsolete messages.

6.3.23 Dial-up via 3G Network Card

There are three popular 3G systems WCDMA, CDMA2000 and TD-SCDMA. They require different 3G Modems. The most popular one is the USB 3G Modem, usually called "USB 3G network card" or "USB network card". Our dial-up utility can detect and drive various USB network cards.

We will take HUAWEI E1750 as an example to show you how to use it.

Step1: please get a 3G SIM card ready

Step2：insert the SIM card into the network card

Step3：plug the network card into your board

Step4: power on and start the 3G dial-up utility. It will automatically list all the detected signals. Click on "OK" to continue

Step5: click on "Connect" to start connecting. If the connection is successful it will show the following dialog
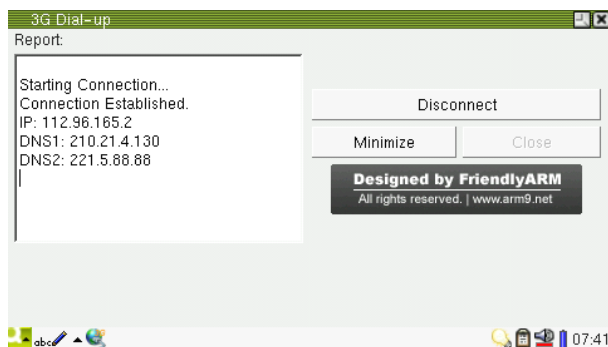
Step6: "Minimize" the dial-up utility, open a browser and you will be able to try surfing the internet!

6.3.24 Recording

Go to the "FriendlyARM" tab and click on the "recorder" icon:
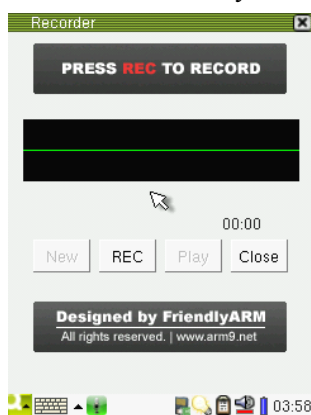
Click on the "REC" button to start recording. When you speak to the microphone on the board, you will see audio waves shown on the screen. Click on the "STOP" button to stop recording.
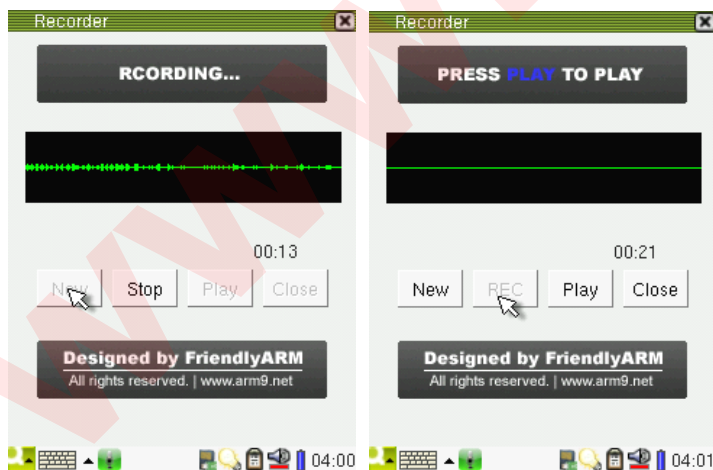
Click on the "PLAY" button to play what you recorded and you can see what you recorded has been saved as "WAV" files in the "Documents" directory.
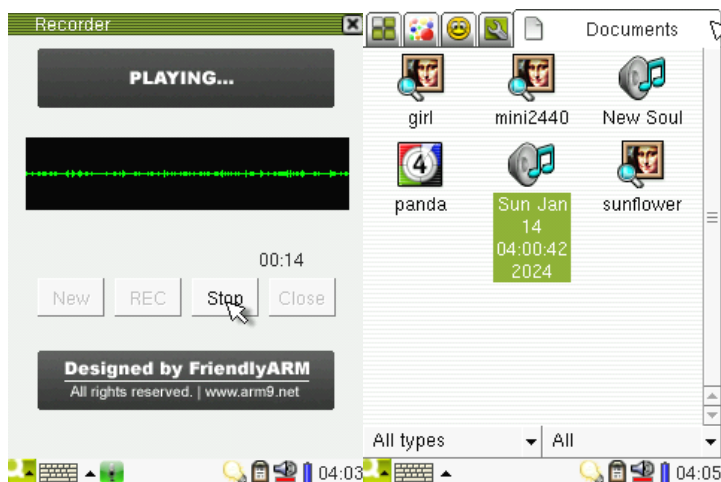
Note: Qtopia 2.2.0 has a recorder utility by itself. But it cannot record audio. We leave it as what it is.

6.3.25 Work with USB Camera

You can use any USB camera with our system which already has drivers for all existing USB cameras. Plug your camera to the USB host port on the board, click on the "USB Camera" in the "FriendlyARM" tab you will see a dynamic preview interface. Click on the "Snap" button you will take a picture which will be saved in the "Documents". This utility has provides functions to adjust brightness, contrast and gamma value. When you start this utility, it will read the camera preset parameters.

Note: although the system already has drivers for USB cameras, each camera might have different output format. Since we cannot collect all cameras this utility would only work for some common cameras, if your camera doesn't work with our system please contact us.
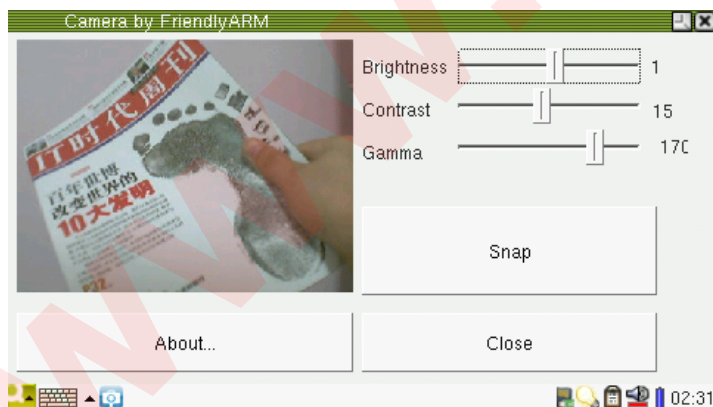
6.3.26 Preview with Camera

To launch the preview utility you need to use our shipped CMOS CAM130 module which also works with the Mini2440 system. Connect the module to your board, power on, go to the "FriendlyARM" tab and click on "CMOS Camera". Clicking on "Snap" takes pictures of what your are previewing. After a picture is taken, "Snap" changes to "Continue". Click on it you will be able to preview again and the picture you just took will be saved in "Documents" (located in "/root/Documents/image/jpeg"). Click on the picture you just took in "Documents" you will see it is opened in Qtopia's "image"

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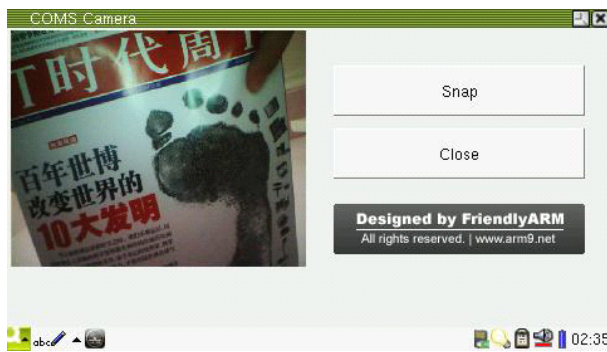
utility.

6.3.27 LCD Test

Go to the "FriendlyARM" tab, click on the "LCD" icon you will see the following dialog pop up:
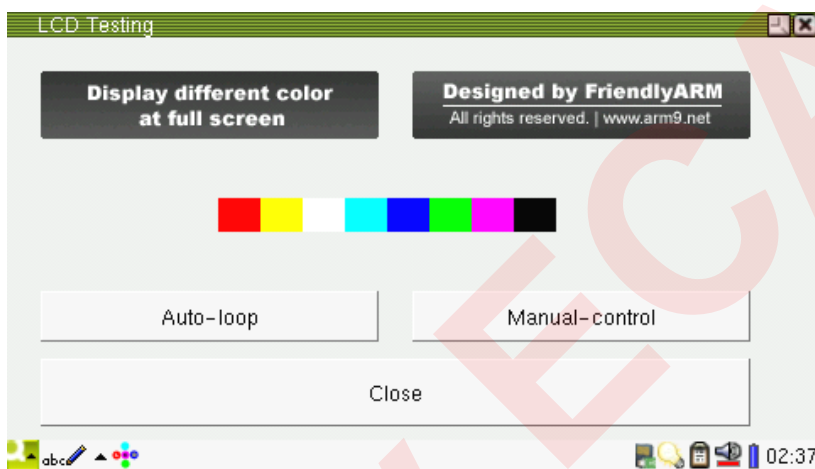
This utility has two modes: auto and manual

Auto-loop loops automatically. Executing it presents "red", "yellow", "white", "sky blue", "dark blue", "green", "pink" and "black". During the loop clicking on any place on the screen will return.

6.3.28 Backlight Control

Note: this feature requires an LCD driven by the 1-wire precise touch driver.

If you already played our Mini6410 system you may notice that after power on the board will turn "dark" without being touched for a period. This is a default system action controlled by the backlight management. In the "Settings" tab clicking on "Power Management" will start this utility

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شماره تماس : ۰۴۱۱۵۵۳۳۷۳۲
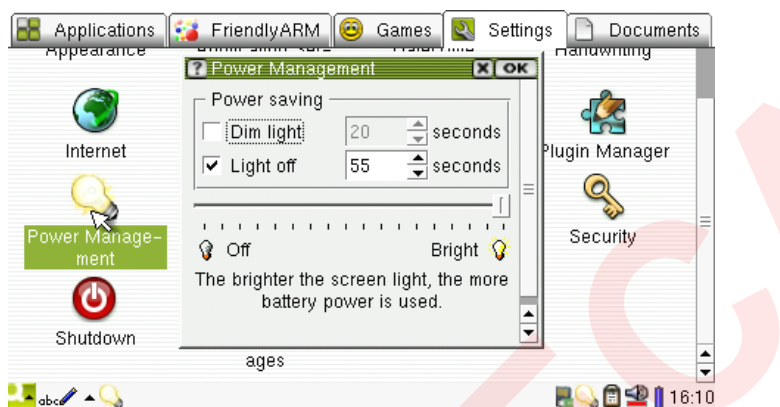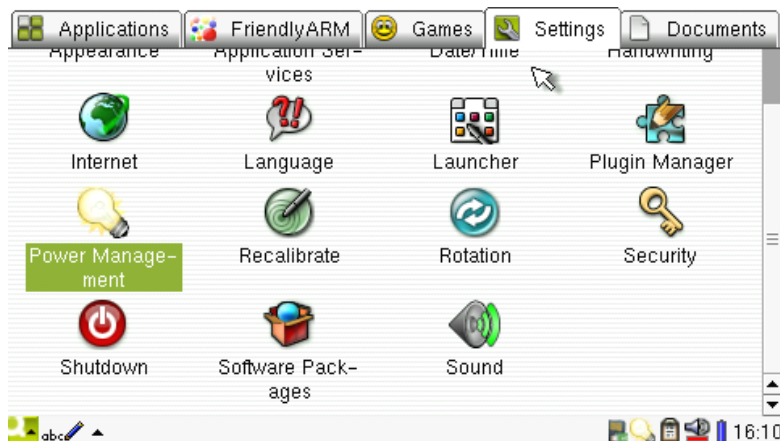
Here the default setting is 25 seconds you can click on the "Up" or "down" arrow to adjust it. If you uncheck "Light off", the backlight will be on as long as the system is powered on. An LCD driven by the 1-wire precise touch driver integrates the function of adjusting the backlight therefore you can slide the slider to get your desired backlight. When you check "Dim light" you will observe that the light is off gradually. Actually adjusting the backlight in our software is pretty straightforward. You can refer to 2.10 for more details on how to adjust it via the command line utility..

6.3.29 A/D Conversion

The Samsung chip has 8 A/D conversion channels but only one converter. In general, AIN4, AIN5, AIN6 and AIN7 are used as YM, YP, XM and XP channels via a four wire resistor. We extended AINs 1-3 which reside on CON6. For easier testing, AIN0 is directly connected to an adjustable resistor W1. How do they share a common converter? The following screenshots will show you:

Click on the "ADC Testing" icon in the "FriendlyARM" tab:
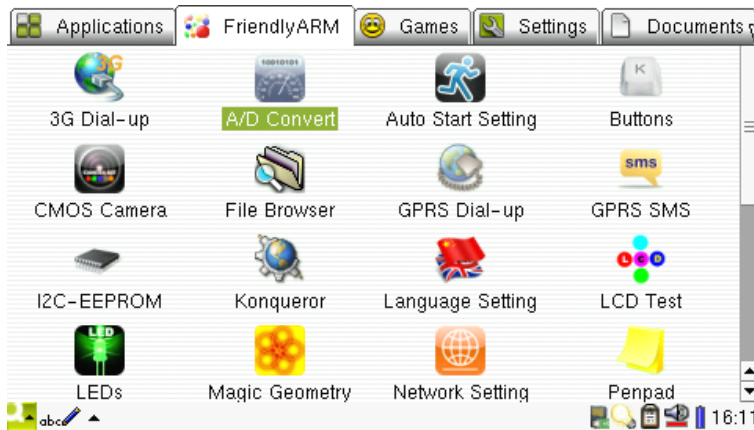
Turning the W1 adjustable resistor, you will see the conversion changes. It has 10 digit precision, therefore the minimum value is close to 0 and the maximum value is close to 1024.
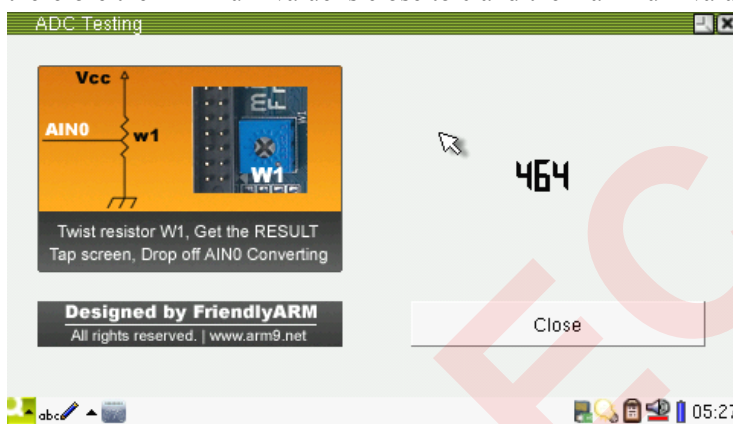
When you click on the touch screen, the A/D converter will take the touch screen as the channel, you will see the result "-1"; when you move your touch pen away from the screen, the A/D converter will take AIN0 as the channel again.
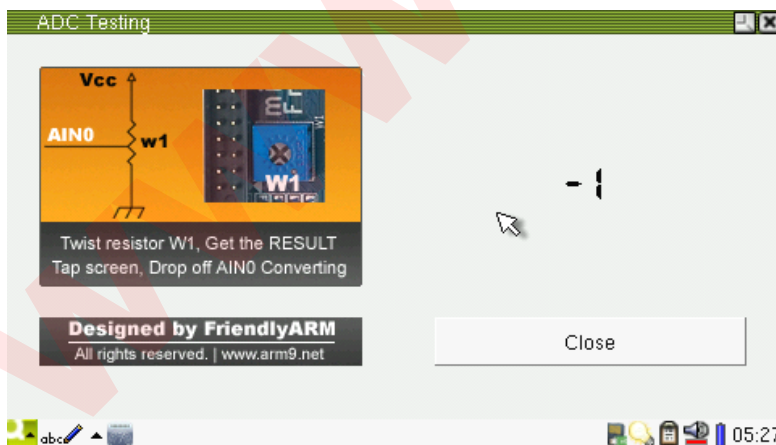
6.3.30 User Button Test

Note: the user buttons don't have dedicated functions and they are just for testing low level drivers. Click on the "Buttons" icon in the "FriendlyARM" tab. Press down any buttons on the board, the corresponding button icons will change to blue, release them, their icons will change back to grey.
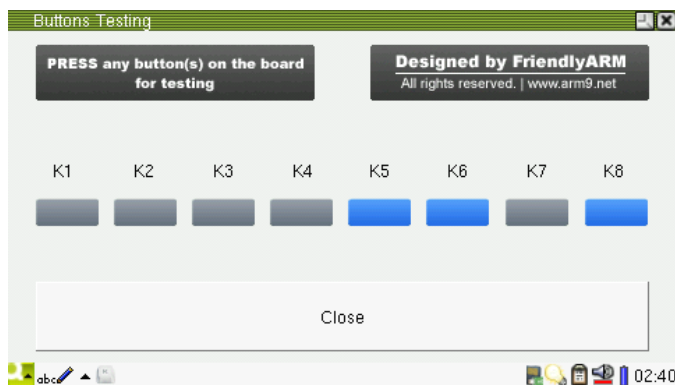
6.3.31 Touch Pen Test

To test whether or not a touch pen works properly, you can draw a line on the LCD, check if there is any offset or vibration. This can be done via the "penpad" utility. Click on the "penpad" icon in the "FriendlyARM" tab.

The "penpad" utility is an easy to use program developed by FriendlyARM. Start it, a yellow drawing area will show up. Draw whatever you like in the area (the pen color is black, its width is 1 pixel), go to "File" -> "Save", you will save what you draw to a png file(in the "Documents" tab, the /Documents/image/png/ directory). The file name begins with 001. The maximum number of files that can be saved is 999. The following screenshot shows that our writing was smooth which meant our pen was accurate.

6.3.32 Barcode Scanning

Our system supports USB barcode scanners which are actually a HID device very similar to a USB keyboard. Therefore a barcode scanner can work any where a USB keyboard works.
Note: before start this utility, please make sure to plug in your scanner.
Click on the "text editor" icon in the "Application Programs" subgroup, scan a code with your scanner, then you will see the code number displayed in the editor.

6.3.32 Language Setting

Qtopia 2.2.0 has a language setting utility which is different from the one in Qtopia 1.7.0.
It only supports English. Therefore we developed a new utility located in the "FriendlyARM" tab (the icon is a waving flag).
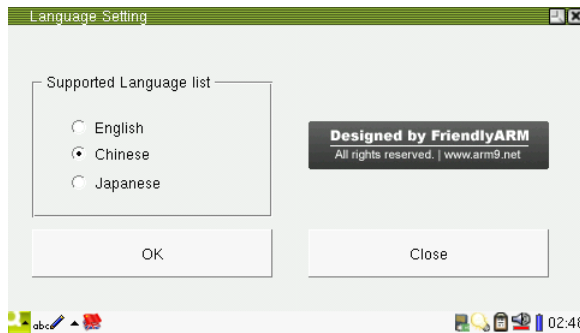
It now supports three languages: English, Chinese and Japanese. When you select "English", then click on "OK", a message will popup asking you if you want to change your language setting. Clicking on "Yes" Qtopia will reboot; clicking on "No" it will return. (Note: the Chinese and Japanese versions only have file names translated).
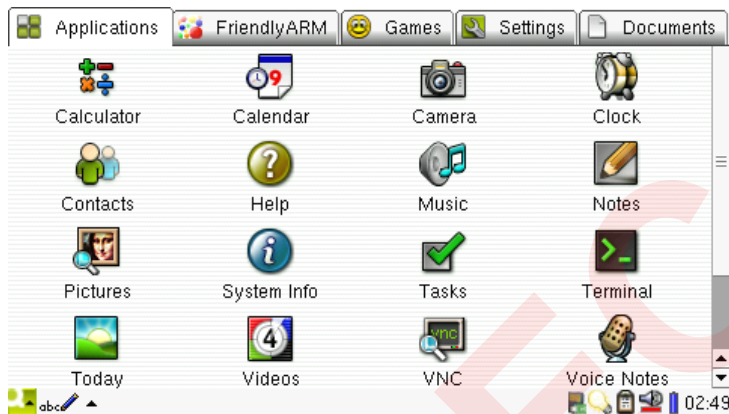

6.3.34 Set up Time Zone, Date, Time and Alarm Clock

When you get our system, the date and time usually might not be accurate. You can adjust them by yourself. Because the CPU has its own RTC and the board has a backup battery, after you adjust the date and time, they will be saved. To adjust them, click on the time zone area at the right bottom of the screen, a menu will show up, please select "Set time..", open the setting interface where you can set parameters such as time zone, date, time and so on
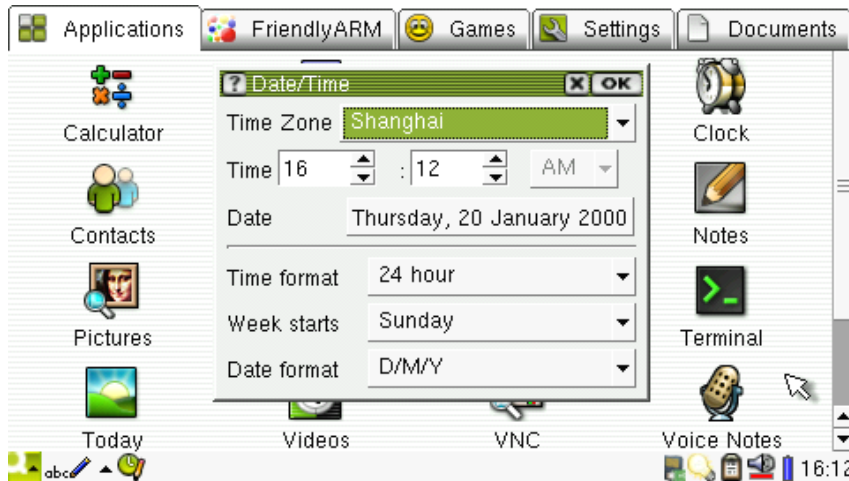
Select "Clock" from the menu.
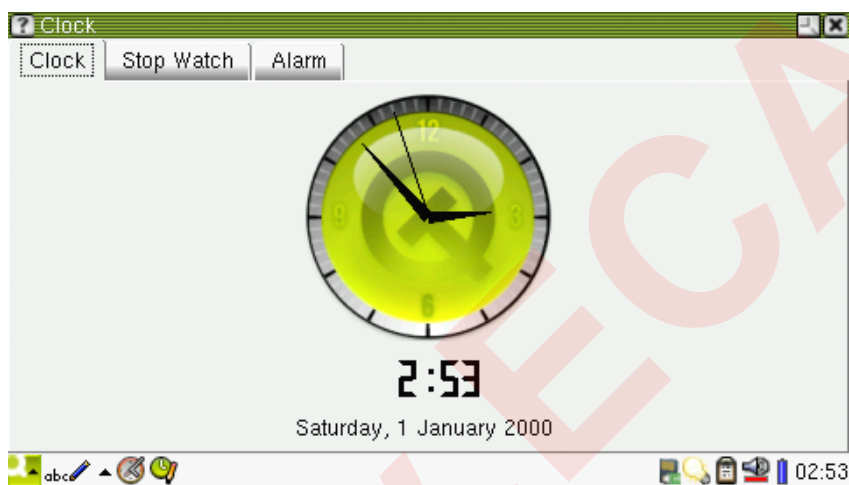
click on "Stop Watch" to open a stopwatch utility
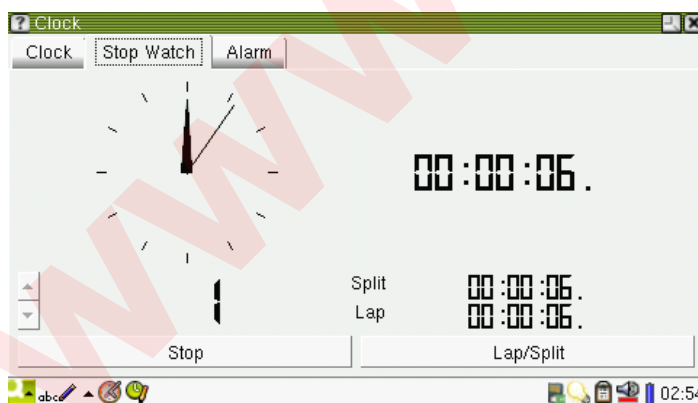
Besides you can set the alarm clock. When it is triggered, you will hear a beeping sound

which lasts about one minute and the following popup window will show up. Click on "OK" to close the alarm clock.

6.3.35 Rotate Screen

Click on the "rotation" icon in the "settings" tab to enter its interface. You can rotate the screen in four directions.
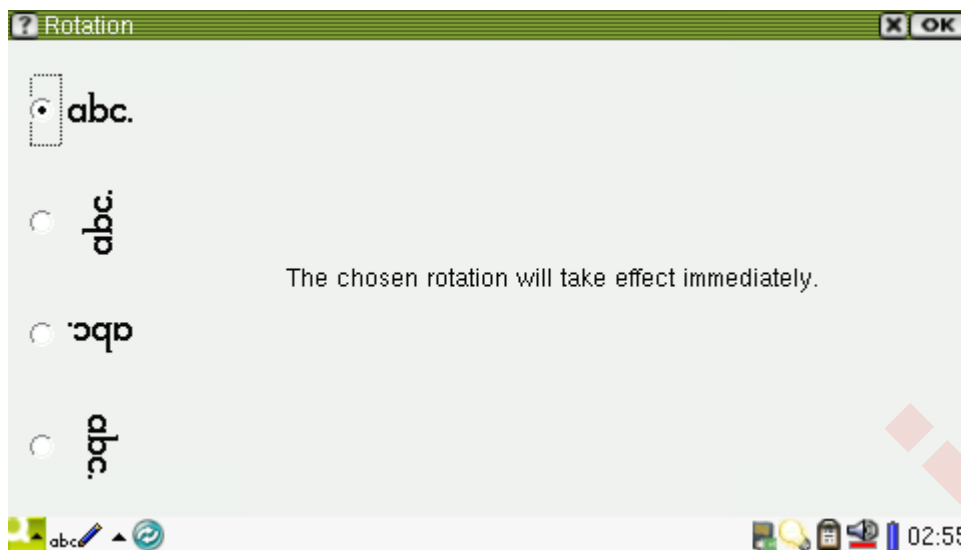
Select the direction you want, click on "OK" you will see the screen rotate.

Note: sometimes you need to reboot Qtopia to see the rotation. It is a Qtopia utility and we hasn't made any change to it. In addition the rotation effect is implemented via Qtopia software and has nothing to do with LCD drivers.

After rotation you will notice that all "FriendlyARM" utilities get rotated too. We implemented this feature to make our utilities displayed properly with different LCDs

6.3.36 Set up Auto Run Programs

By setting "auto run" you can make Qtopia launch its own or your programs after it boots up. It is very similar to what you see in Windows "Programs -> Startup".

Click on the "Auto Start Setting" icon in the "FriendlyARM" tab.

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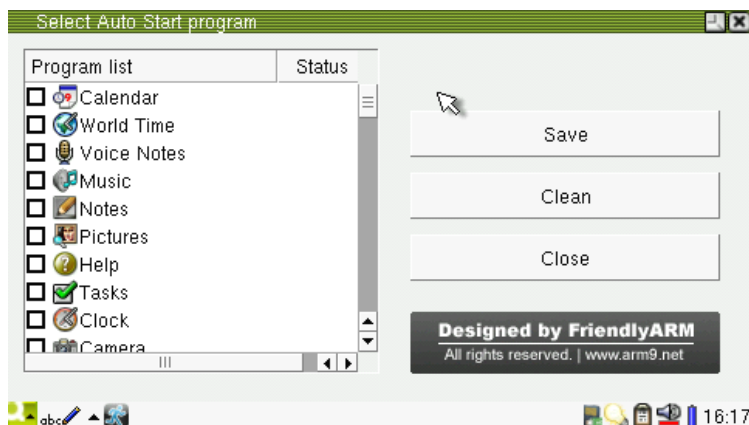
Those program listed are available programs which include all Qtopia programs, the status column indicates whether a program is set to auto start. The status is unique. For instance, if the "Serial Port Assistant" is checked, its status will show "Auto Start", click on "Save", a message box will pop up prompting that the net setting has been successfully saved. Close this utility, reboot the system you will see the "Serial Port Assistant" is auto run.
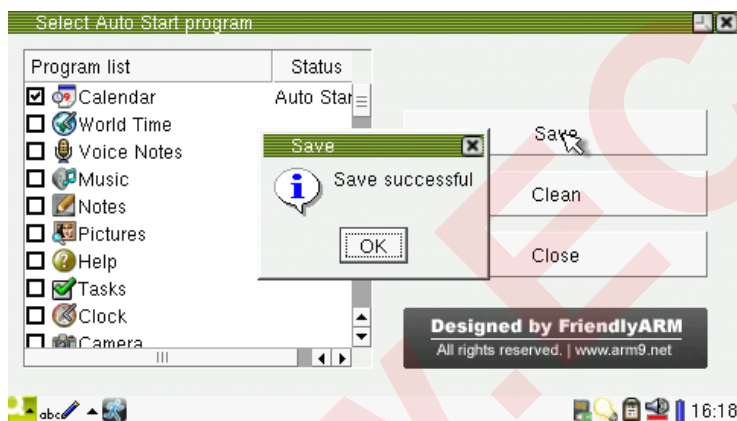
To disable auto run for a program, just click on "Clean" and "Close", a message box will pop up, click on "Yes" the auto run for that program will be disabled.
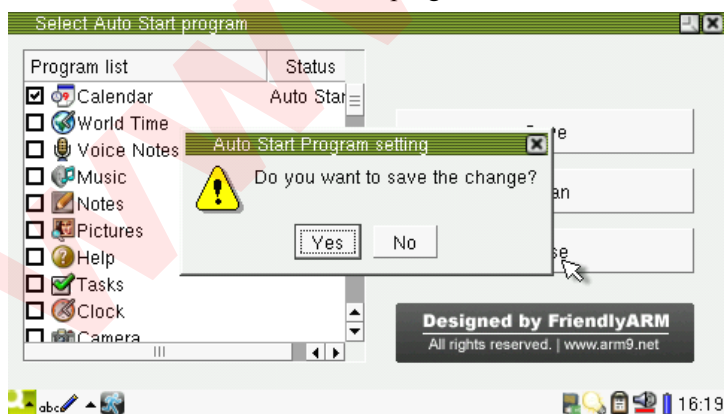
6.3.37 System Shutdown

In the "Settings" tab, click on the "shutdown" icon you will see four options on the shutdown window. Shutdown: Press this button, Linux will end all the programs and services to shutdown the whole system. After the whole system is shutdown, the CPU will not be running and the system consumes lest power.

However since our system doesn't have a hardware power down circuit you still can see the power LED on the board is on.

Reboot: This is a "hot" reboot button. If your system boots from the Nor Flash, after you press this button, the system will shutdown, reboot and enter the supervivi main menu. If

your system boots from the Nand Flash, after you press this button, the system will shutdown, reboot and enter the Qtopia interface.

Note: Reboot is different from the "Watchdog" function we will introduce. The "Watchdog" is "cold" reboot and doesn't end programs or services but reset the system instead.

Restart Server: it restarts the Qtopia system only. It doesn't interrupt the running Linux.
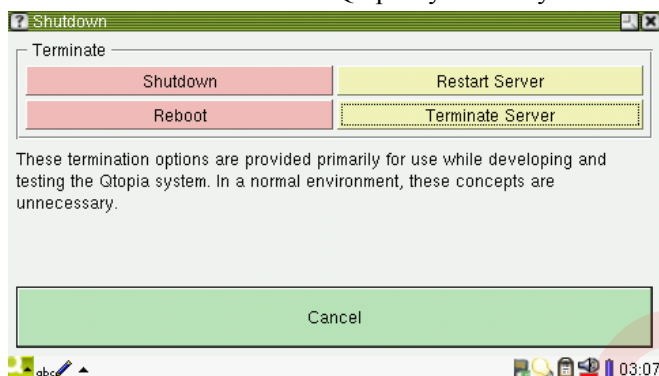
Terminate Server: it shuts down the Qtopia system. After press this button, the Qtopia interface will be disabled. What is left on the screen is the left data in RAM and it is not an active graphic interface.

Note: the original Qtopia 2.2.0 system doesn't "shutdown" or "reboot" effectively, we changed its code to make it work.

6.3.38 Watchdog

The "Watchdog" is a very basic utility in embedded systems. The S3C6410 chip already has a watchdog. The latest Linux kernel has drivers for it.

Click on the "Watchdog" icon in the "FriendlyARM" tab
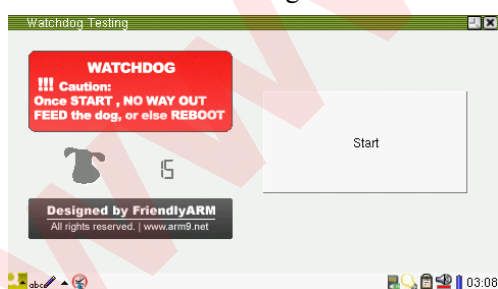
Note: before take any action, please read the notes in the red area: once start, no way out, feed the dog, or else reboot!

Here we set a countdown time 15 seconds. To feed the dog, click on the "Feed" button. Keep feeding, it will always have bones and the system will not reboot.
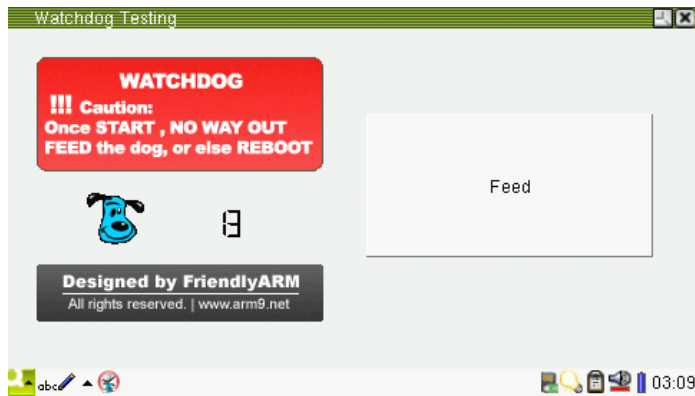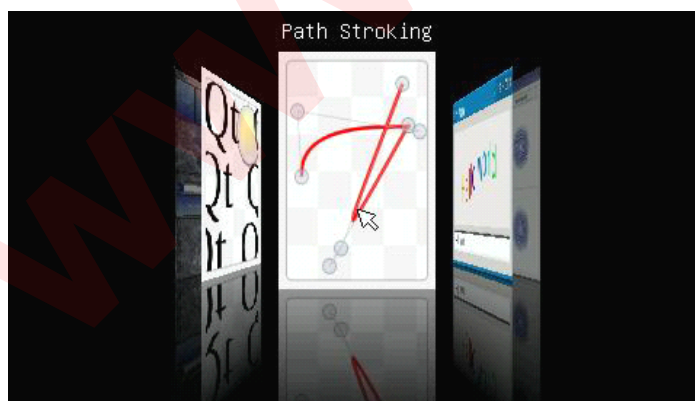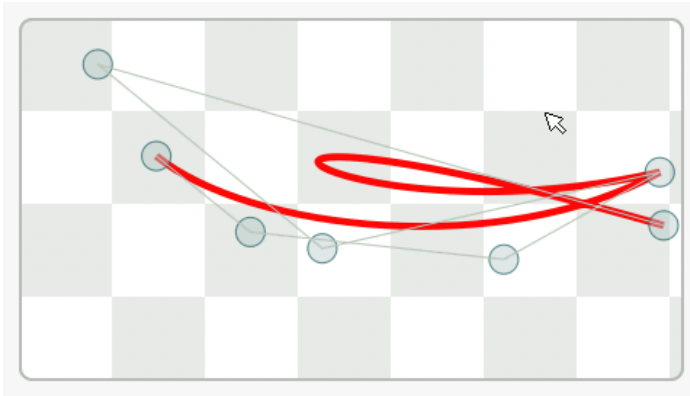
6.3.39 Start QtE-4.7.0

In order for users to switch freely and smoothly between different systems we implemented a feature that allows Qtopia-2.2.0 and QtE-4.7.0 to co-exist in the same file system. In Qtopia-2.2.0, by clicking on a common application icon users will be able to start QtE-4.7.0. After close the QtE-4.7.0 utility, users will be able to return to Qtopia-2.2.0.

QtE-4.7.0 runs as follows. It is a program manager that display a CoverFlow effect. You can drag it left and right and run it by clicking on one of the Covers.

You can exit QtE-4.7.0 by clicking on "Exit Embedded Demo" and return to Qtopia-2.2.0

6.3.40 Start Qtopia4

In order for users to switch freely and smoothly between different systems we implemented a feature that allows Qtopia-2.2.0 and Qtopia4(Qt Extended 4.4.3 Phone) to co-exist in the same file system. In Qtopia-2.2.0, by clicking on a common application icon users will be able to start Qtopia4. After close the Qtopia4 utility, users will be able to return to Qtopia-2.2.0

If you have never run Qtopia4 on the system you will see the following GUI after start it
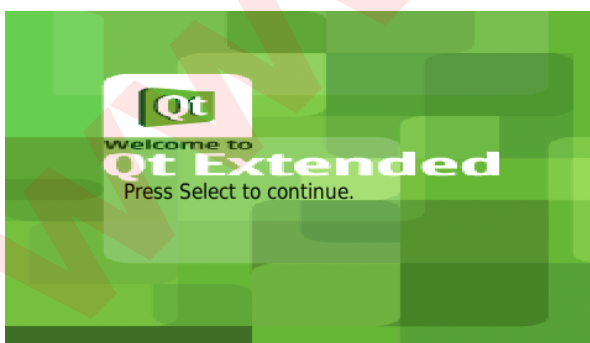
Click on the screen you will be directed to a configuration window where you can set up your date and time. You can ignore it here and click on "Finish" to continue.

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After a while you will enter Qtopia4 and the title is "Qt Extended"

There are three buttons "Options", "Menu" and "Quit". "Quit" is implemented by
FriendlyARM to allow users easily returning to Qtopia2. You can add your own features too
in the source code. Here please click on "Menu" to enter the main function menu.
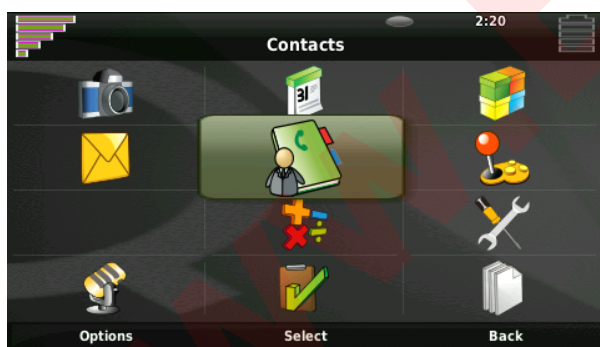
Qtopia4's applications are very limited which we will not talk too much about here. Click
on "Back" to return to the main menu and click on "Quit" to return to Qtopia2.

Note: when quitting users will see a flash which doesn't exist in Qtopia and is implemented
by FriendlyARM. It is open source and users can check it.

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So far, we have introduced most of the GUI utilities that will be used to manipulate hardware. There are other utilities you can try by yourself.

6.3.41 Which Qt to Choose

With so many Qt options users may be confused about which one to use. Actually it all depends on what you need. For development boards it would be better to have a complete desktop version (Qtopia is one for mobile devices) for various LCDs. Per this requirement we took Qtopia-2.2.0 and made it possible for Qtopia4 and QtE-4.7.0 to co-exist and allow users to smoothly switch between them. It is not a fancy technology and we just made it based on basic C/C++ functions which are enough for us to achieve what we need.

If you don't need the whole system and just some of the applications you recommend you to choose QtE-4.7 or high versions since they can work in more platforms and are easier for beginners to learn and migrate. In addition a QtE-4.7 application doesn't take too much memory.

6.4 Wince System test

6.4.1 Calibrate Touch Screen

The default WinCE system's touch screen parameters are for NEC 7"LCD(S70). Other LCD systems may require different settings therefore users need to re-calibrate the screen. Below are the steps:

Step 1: connect a USB mouse to your board, go to "Start -> Settings -> Control Panel", locate the "Stylus" icon, double click to open its property window and click on "Calibrate -> ReCalibrate"
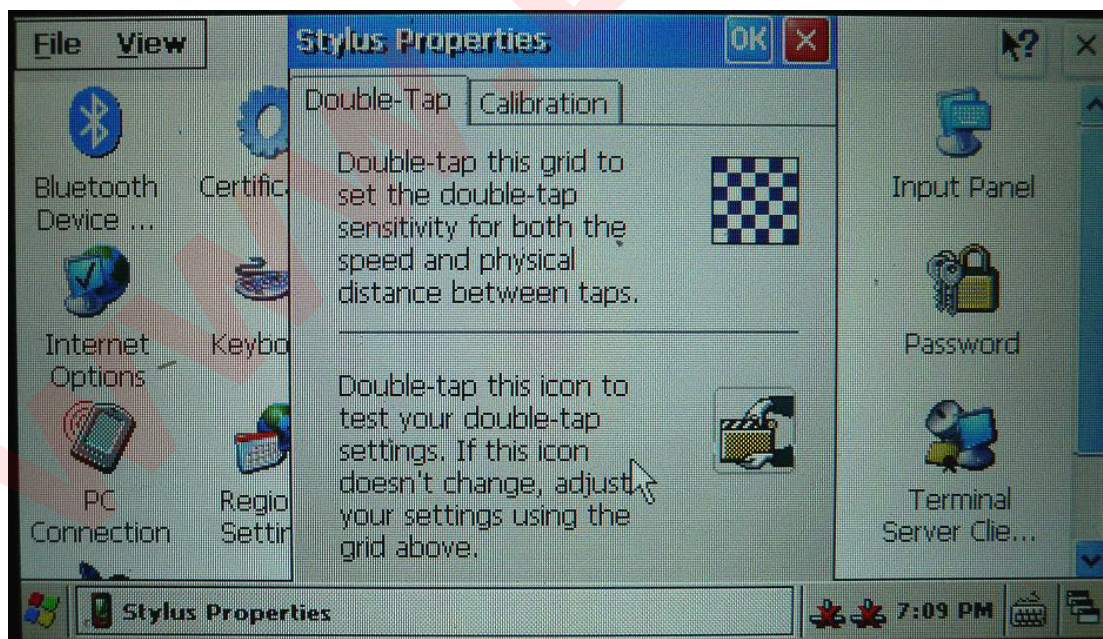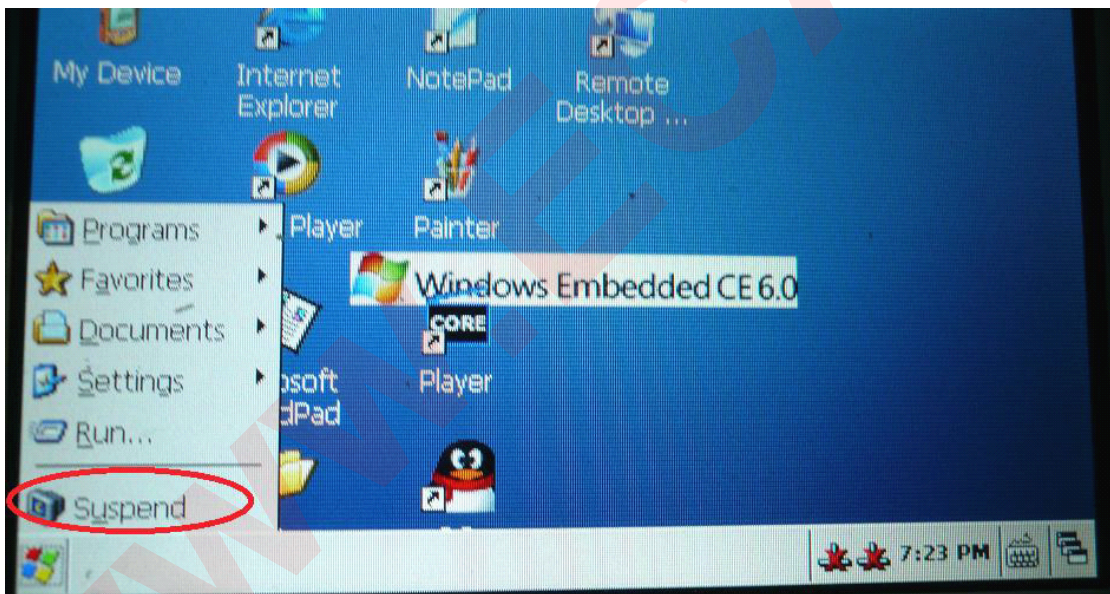

Follow the system's prompt to start calibration. After you are done you will see the following screen. Click on any position you will return to the property window. Please click on "OK" to save and exit.

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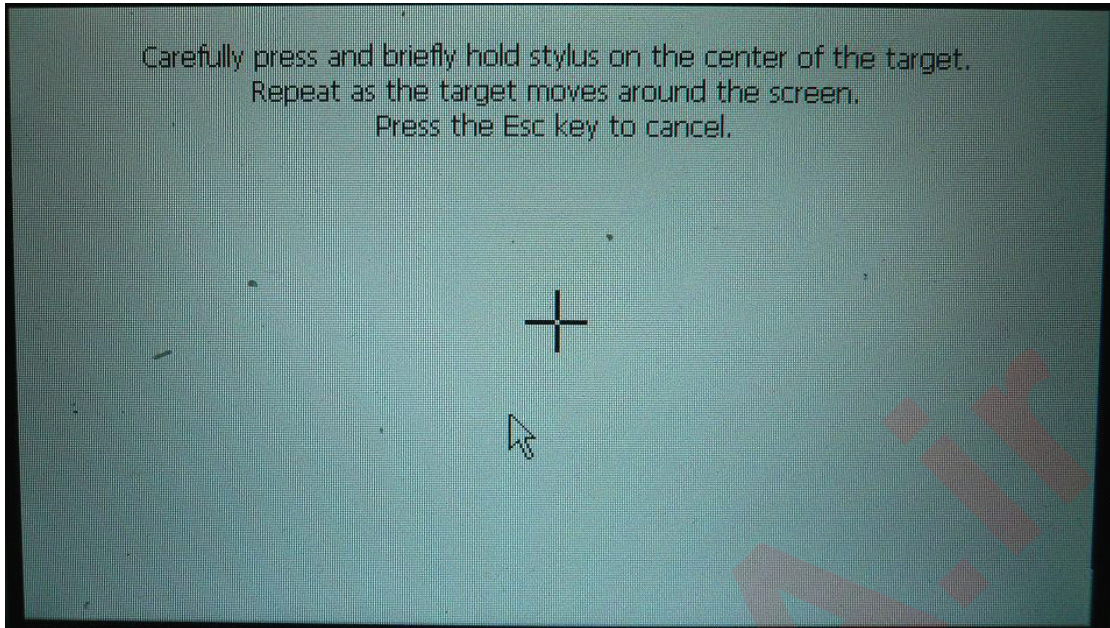
If you want to save the setting, you can go to "Start -> Suspend" and reboot.


6.4.2 Check System Info

Go to "start -> Settings -> Control Panel -> System" and you can check your system info. Or you can right clickon "My Device -> Property".

6.4.3 Set Time Zone and Date

Click on the time area on the bottom right corner, the time setting interface will pop up. You can just follow its prompts to set time and date. Click on "OK" to save and return and your settings will be saved
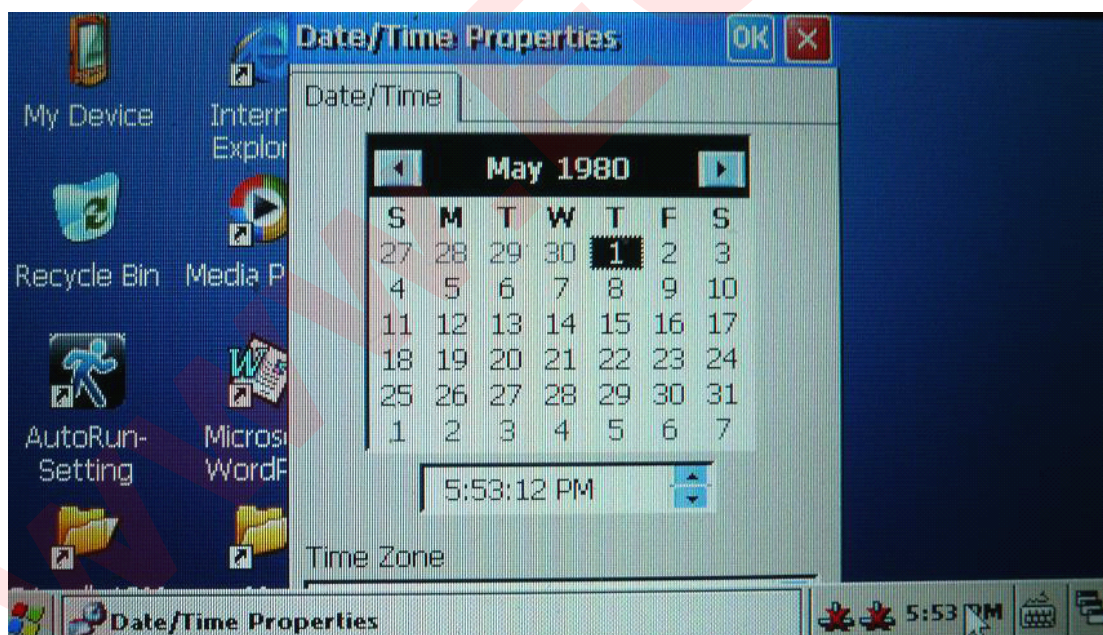
6.4.4 Nand Flash Memory

Open "My Device", you will see a "NandFlash" icon. Users can save data in it and will not lose it even after the system is powered off.
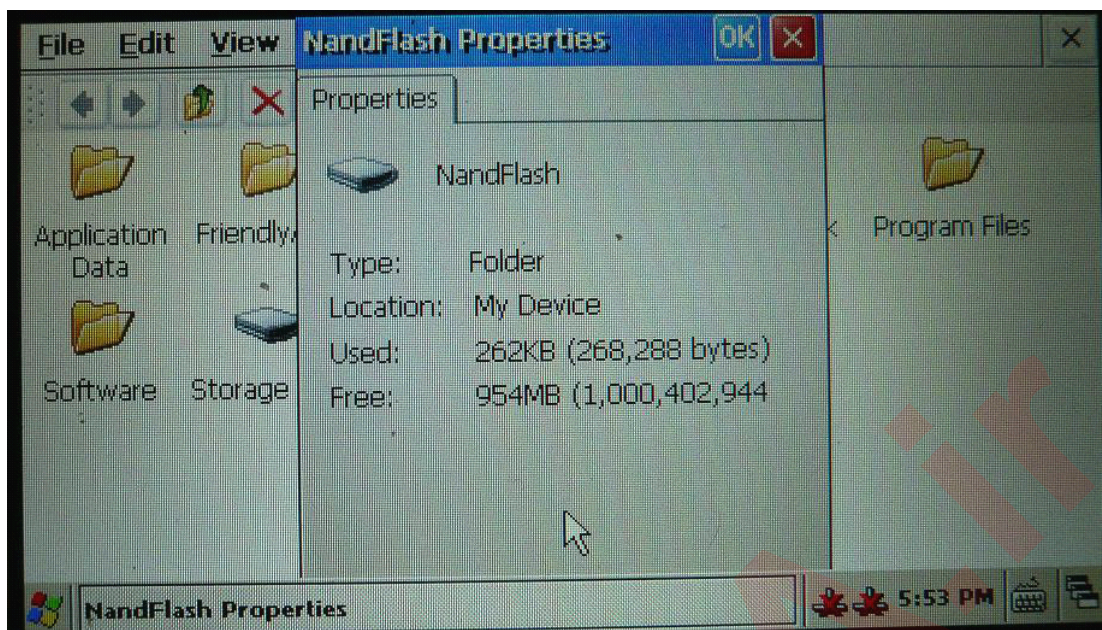
6.4.5 Use Flash Drive/SD Card

In WinCE we can use use flash drives. After WinCE is booted insert a USB flash drive into the host socket, seconds later the drive will be automatically mounted. Double click on "My Device" and you will see it. Then you can enter it and operate your files.

You can do it the same way for SD cards. Insert an SD card into the SD card socket and you will see it listed as "Storage Card". Enter it and you will be able to operate your files.
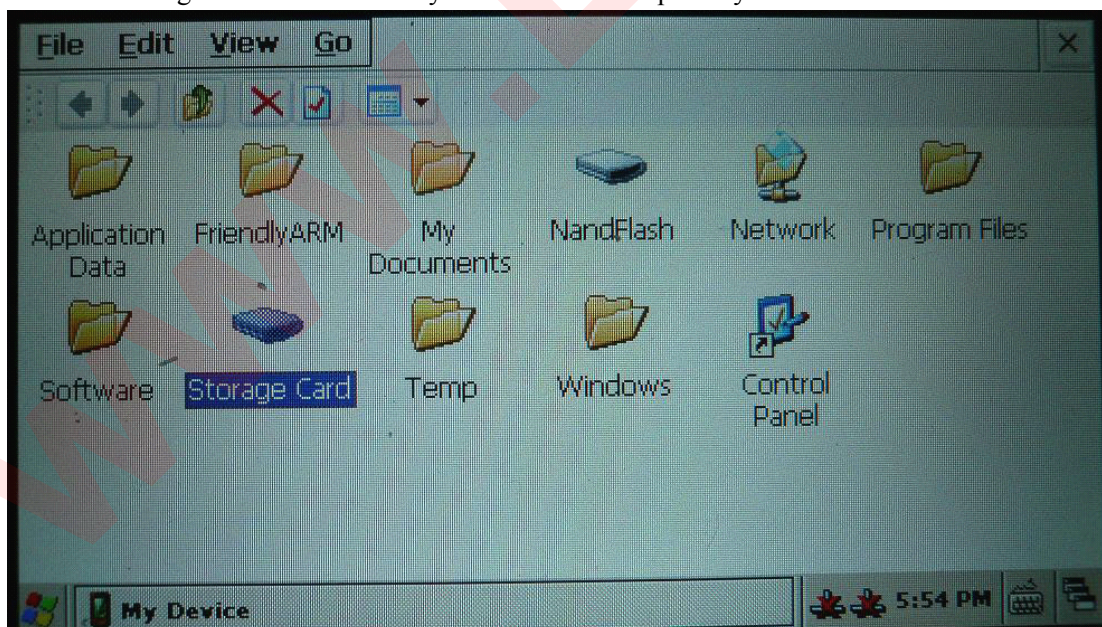
6.4.6 Play MP3

Users can use WinCE's MediaPlayer to play mp3

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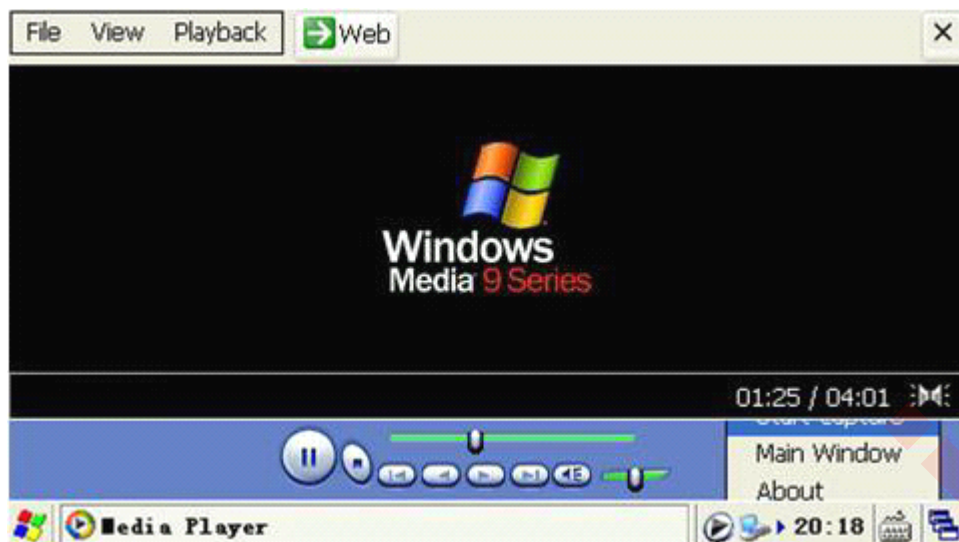
6.4.7 Test LED

Go to "FriendlyARM", click on "LED-Test" you will see the following dialog and you can manipulate LEDs by clicking on the buttons on it

6.4.8 User Button

Go to "FriendlyARM", click on "Buttons" you will see the following dialog. Clicking on the buttons you will observe their color changes
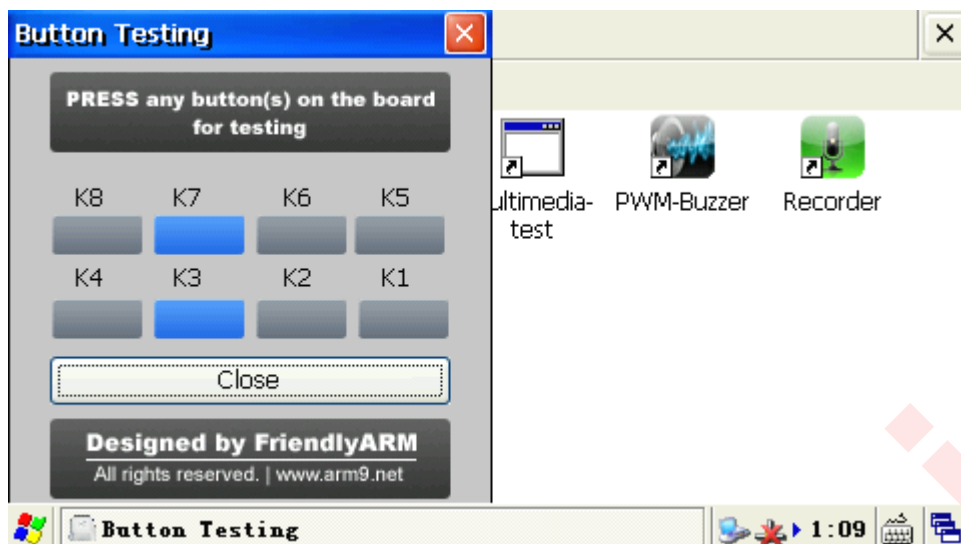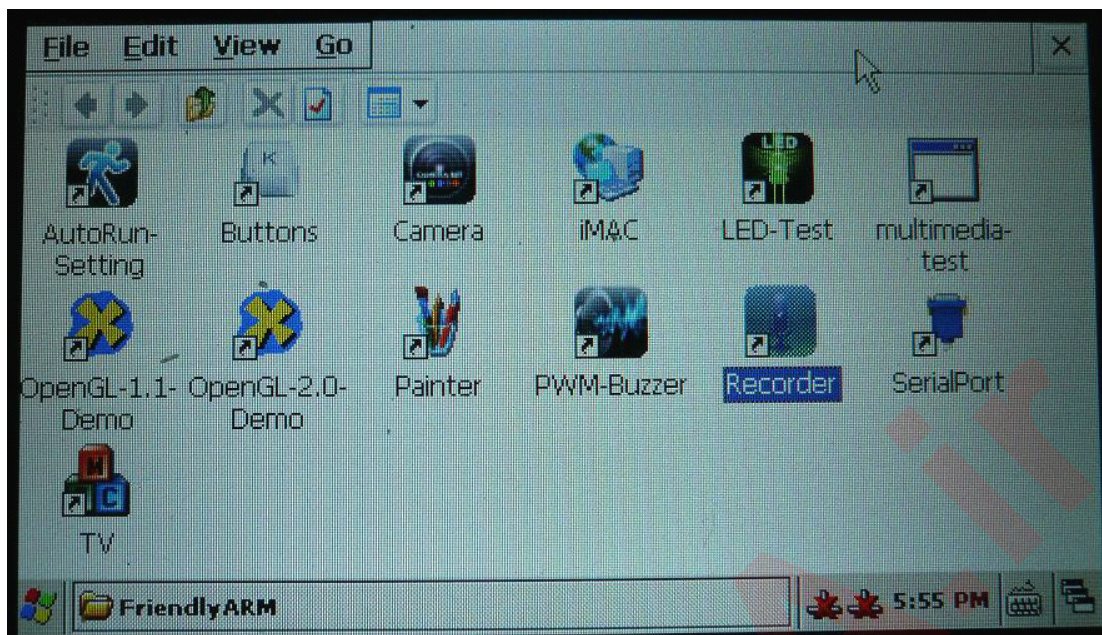
6.4.9 Test PWM Buzzer

Go to "FriendlyARM", click on "PWM-Buzzer" you will see the following dialog. Click on "Start" you can test its beeping. Click on "Stop" you can stop it.
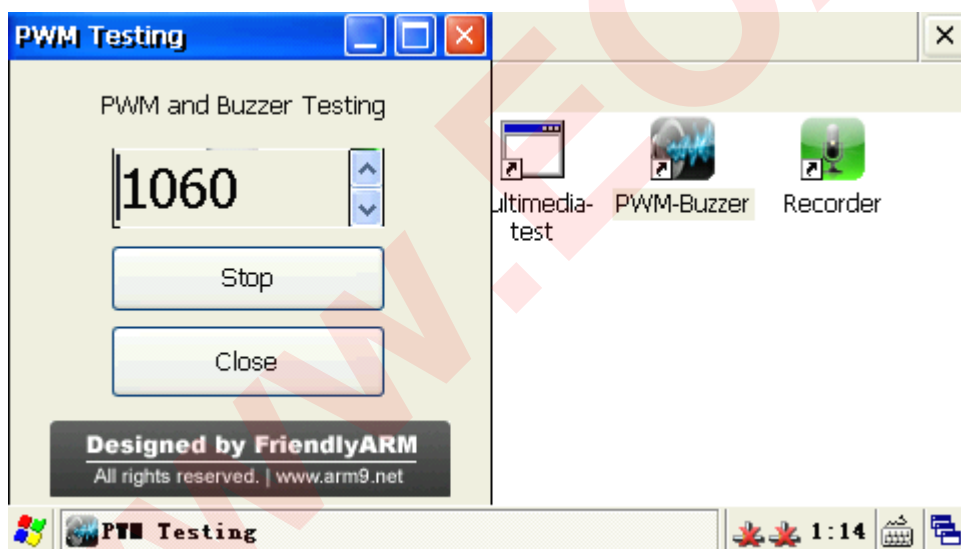
6.4.10 Audio Recording

Go to "FriendlyARM", click on "Recorder".

Click on "Record" to begin recording. Now if you speak to the microphone on the board,your voice will be recorded. Click on "Stop" to stop redording

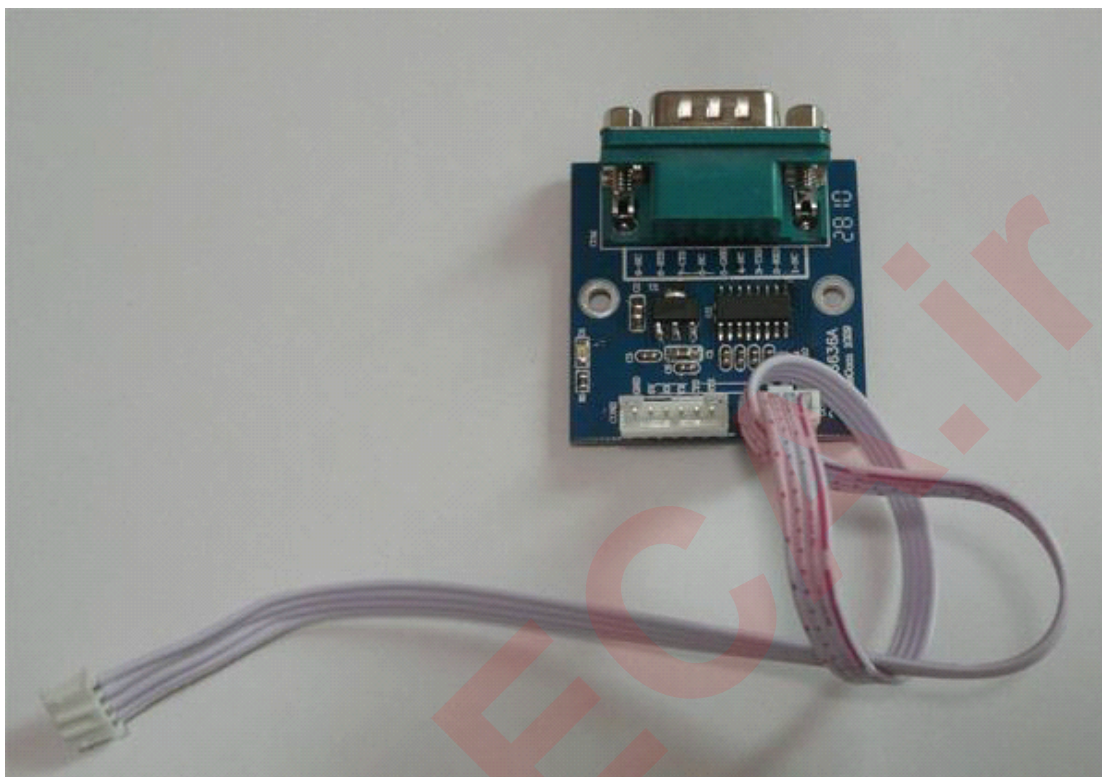

Click on "Play" it will loop the audio you just recorded.
Note: this utility doesn't save the recorded audio file.

6.4.11 Serial Port Assistant

Note: the Tiny210 BSP includes drivers for three standard serial ports: COM1, 2, 3 and 4. To test these three ports you need our extension board. Please hook up your extension board as follows:

Go to "FriendlyARM" and click on "SerialPort", you will see the following dialog
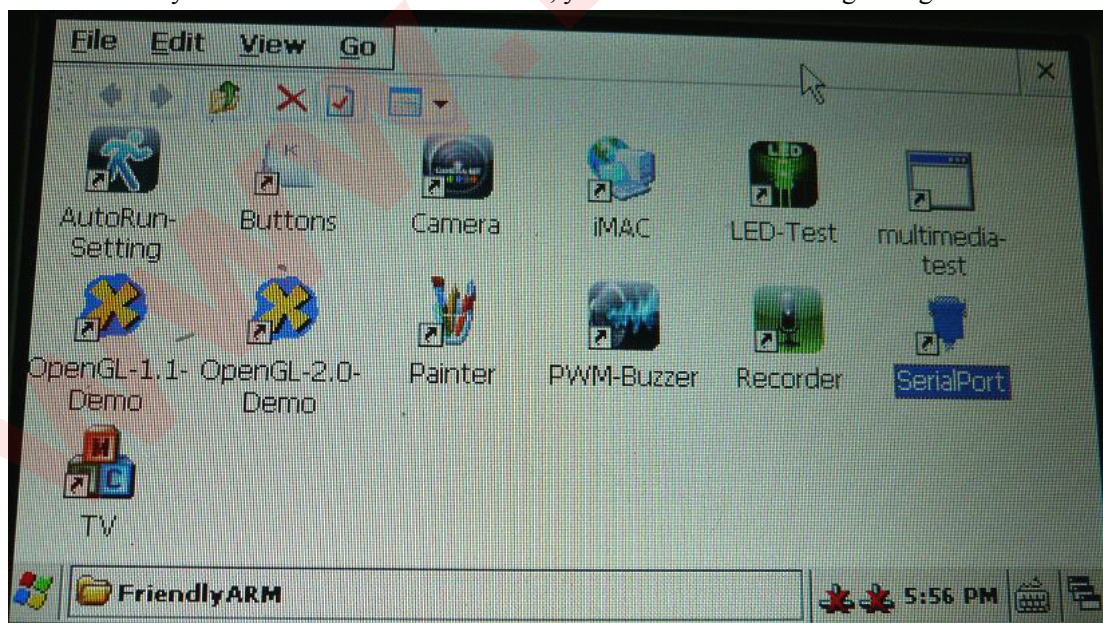
Click on "Settings", select COM2, set its bit rate to 115200, click on "OK" to save it.
Meanwhile connect your extension board(COM2) to PC, set up your PC's corresponding COM.
In the main window, click on the "Open" button, (the button's title will change to "Close"), type some characters in the edit area and click on the "Send" button. You will see the characters you typed received in your PC.
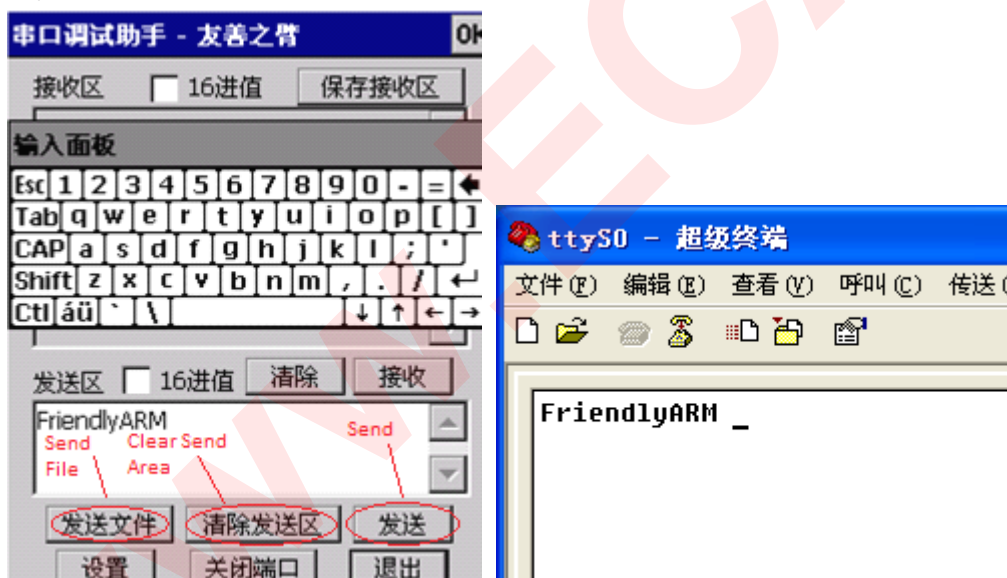
In the Serial Port Assistant's main window, click on the "Receive" button (its title will change to "Not Receive"), type some characters in the edit area of your PC's serial port window, you will see the characters you typed received in the Assistant's main window
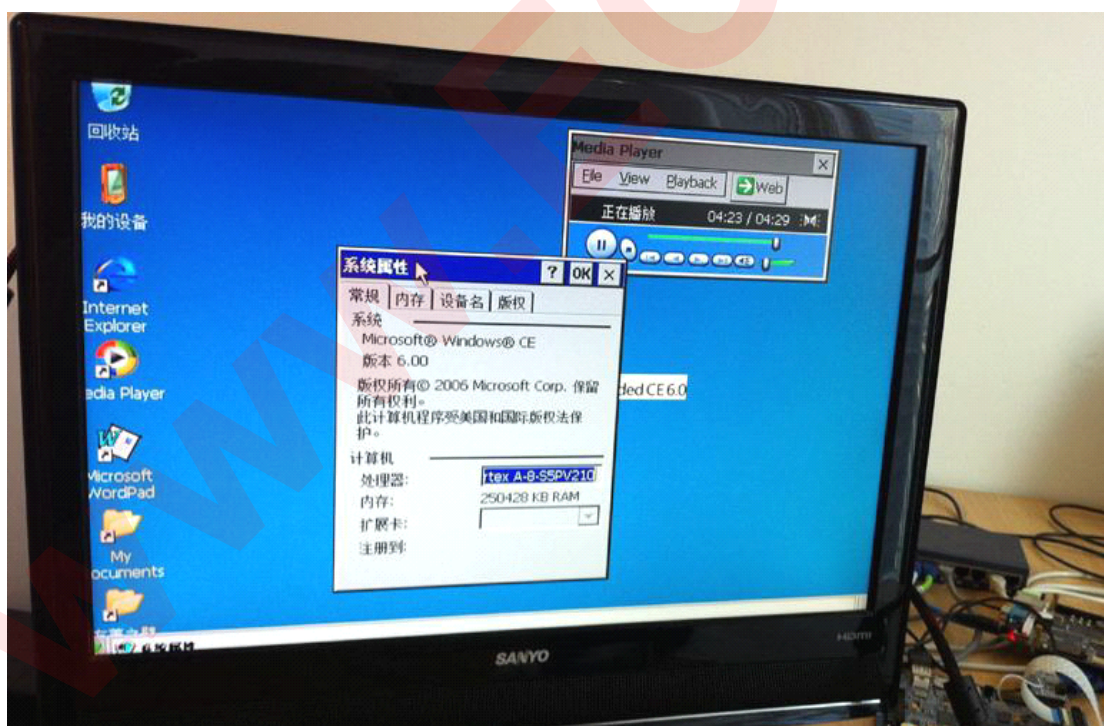
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We can follow this procedure to test COM3 and COM4 too

6.4.12 HDMI sync output to TV

connect Tiny210 board to TV or monitor by HDMI cable, WinCE image and sound will synchronize output to TV or monitor automatically , as shown below:

To set HDMI output resolution and scaling parameters,oppen the   "friendly Arm" program group on the desktop,double click "HDMISetting",the setting windows as shown below:

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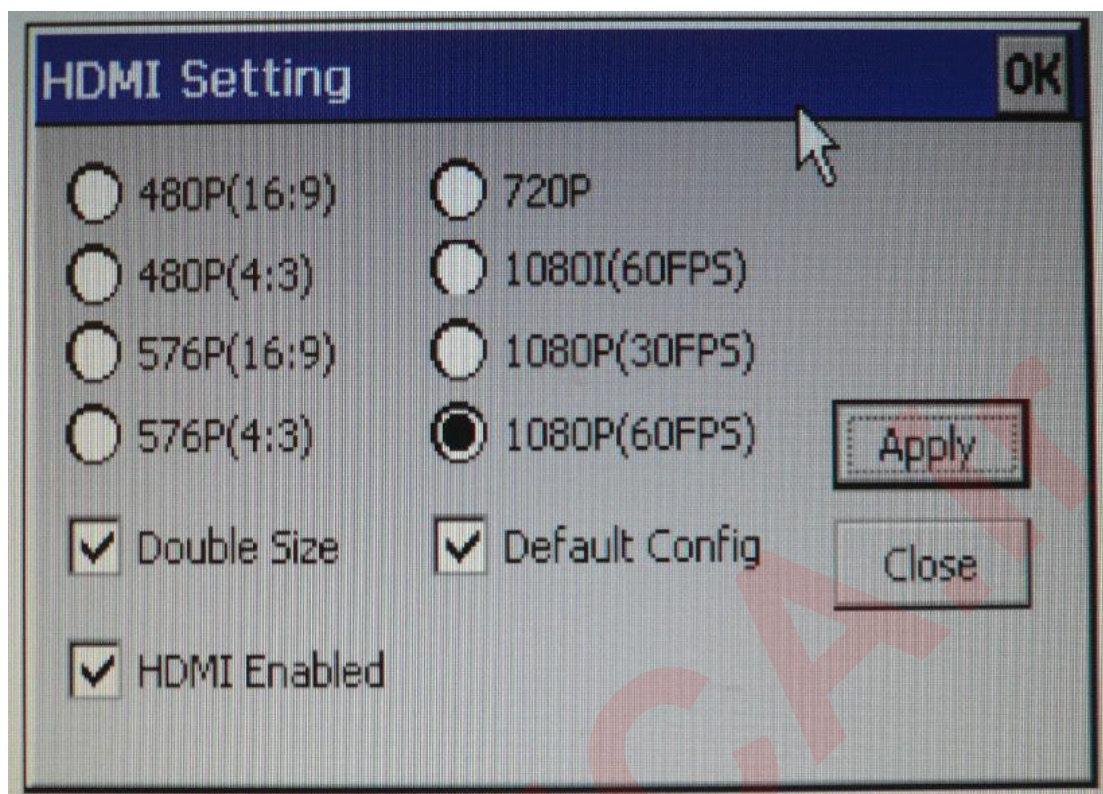
In the setup program, you can set :

1)Double Size   is used to set whether scaling output the double size image   , otherwise it is 1:1 size output the image.

2) set HDMI resolution.There are 8 resolution available.

  Cancel "HDMI Enabled" and click Apply to close HDMI booting sync output.

6.4.13   Configure MAC Address

The integrated DM9000 network card doesn't come with a MAC address therefore we strongly recommend our users to set it prior to connecting to the internet after burning an image into the board.

After you set up your MAC address it will be written into the registry and will be there forever unlessyoureinstall you system or update it.Click on the "iMAC" icon to start the utility.
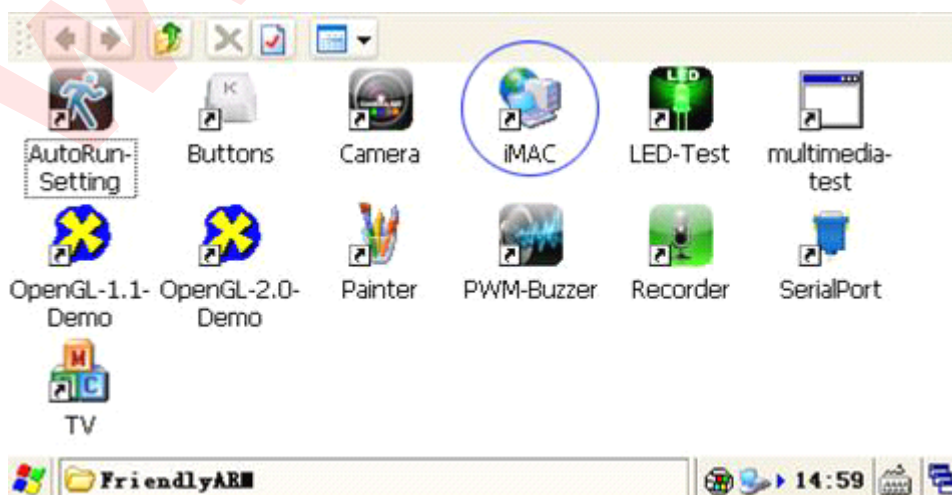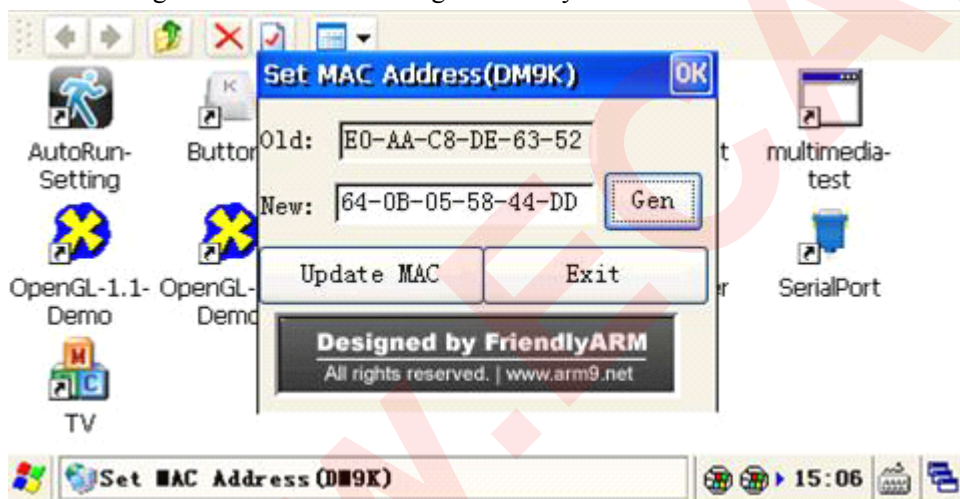
On the MAC Address setting dialog, "Old" shows the current MAC. You can type your new in "New" or click on the "Gen"button to generate a ramdom MAC which in general achieves better results:

The following screens shows a MAC generated by "Gen"

Click on "Update MAC" to save your MAC into the registry and reboot your system
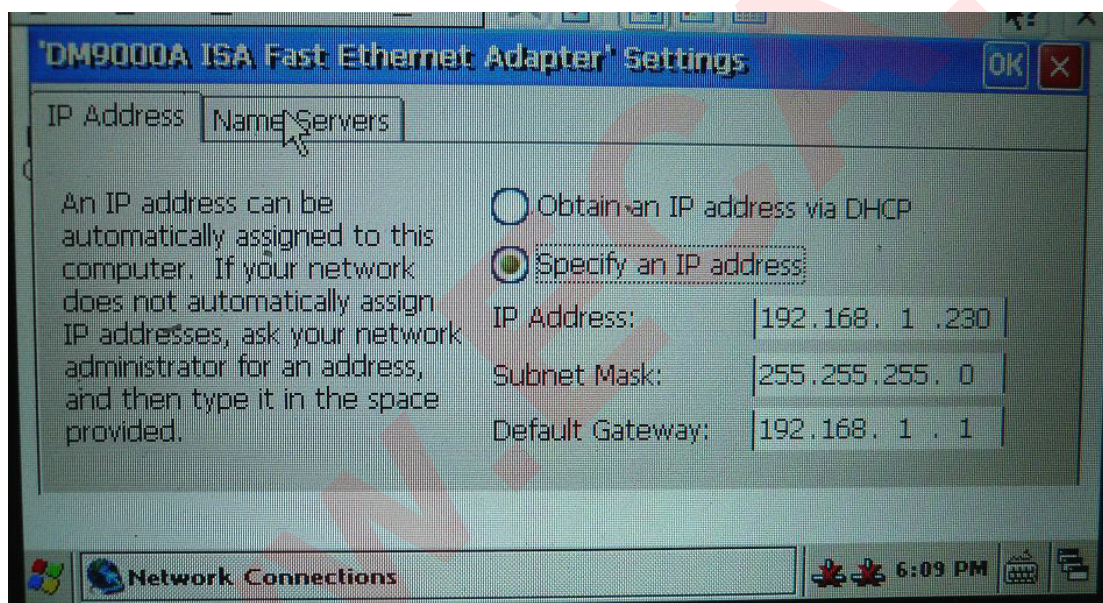
6.4.14 Configure Ethernet

Before you can browse the internet you need to set up your IP, gateway and DNS properly.Please go to

"Start -> Settings->Control Panel", launch the network setting utility and locate your DM9CE1.

Double click on the DM9CE1 icon, you will see the following dialog in which you can make your network configurations.

After setting up your network properly you can try it now

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6.4.15 Backlight Control

If your system is preinstalled with WindowsCE6, you may notice that your LCD backlight will turn off if it doesn't accept any touch within 30 seconds. This is manipulated by the backlight control function. 4.3" and 7" LCDs that have the 1-wire precise touch function have the backlight control function.In WinCE the backlight control driver utilizes standard system interfaces and you can easily manipulate it via software.
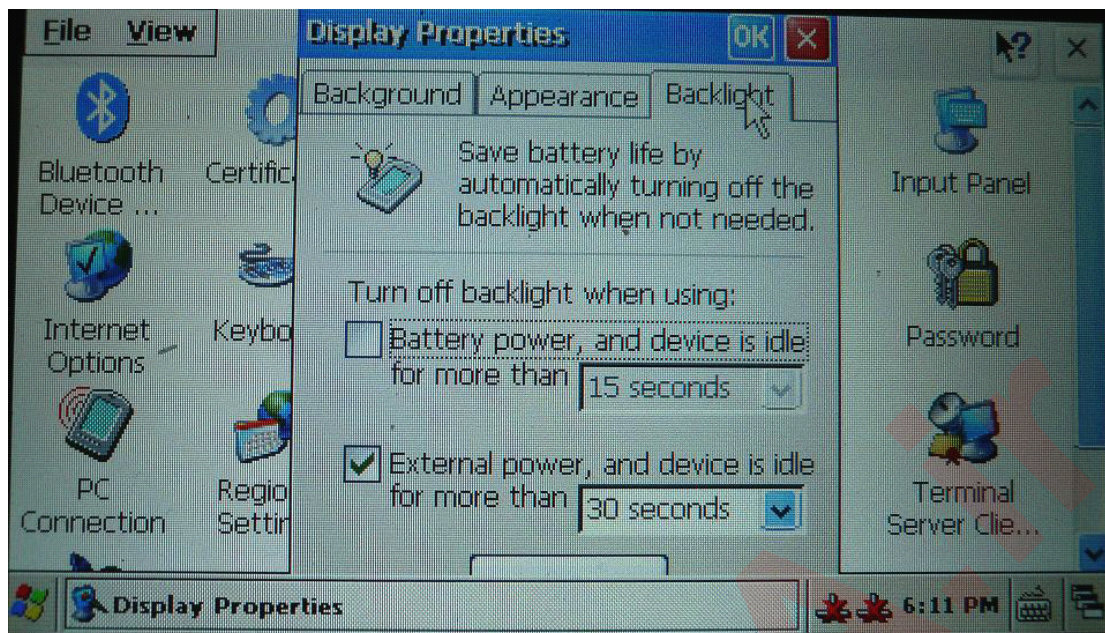
Please go to "Control Panel -> Display"
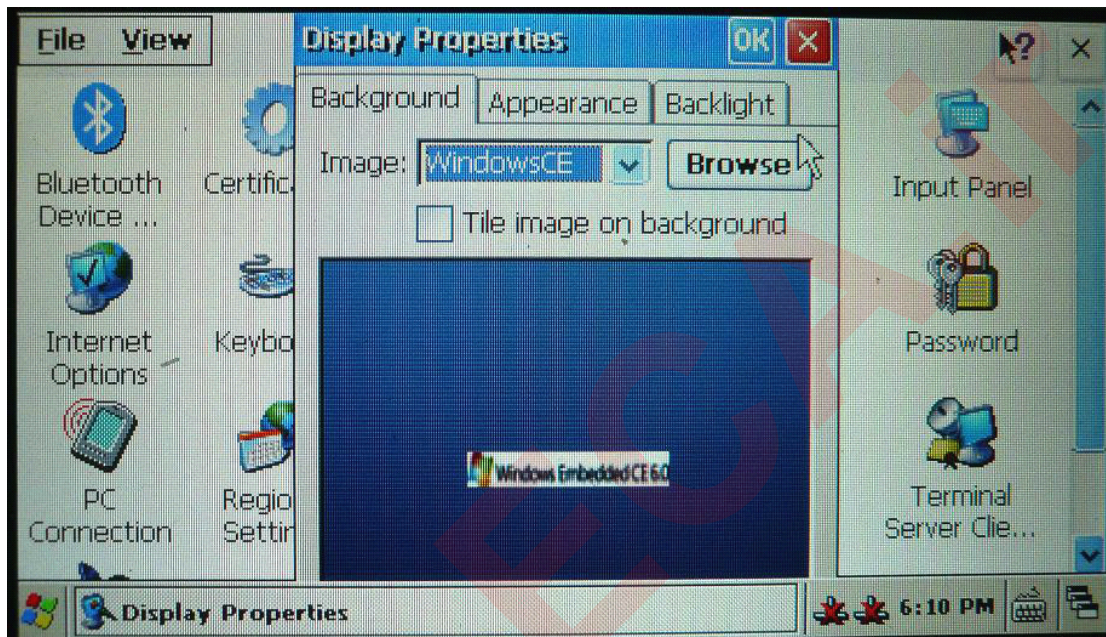
Click on the "backlight" tab you will be able the set its turn-off time. By default it is 30 seconds
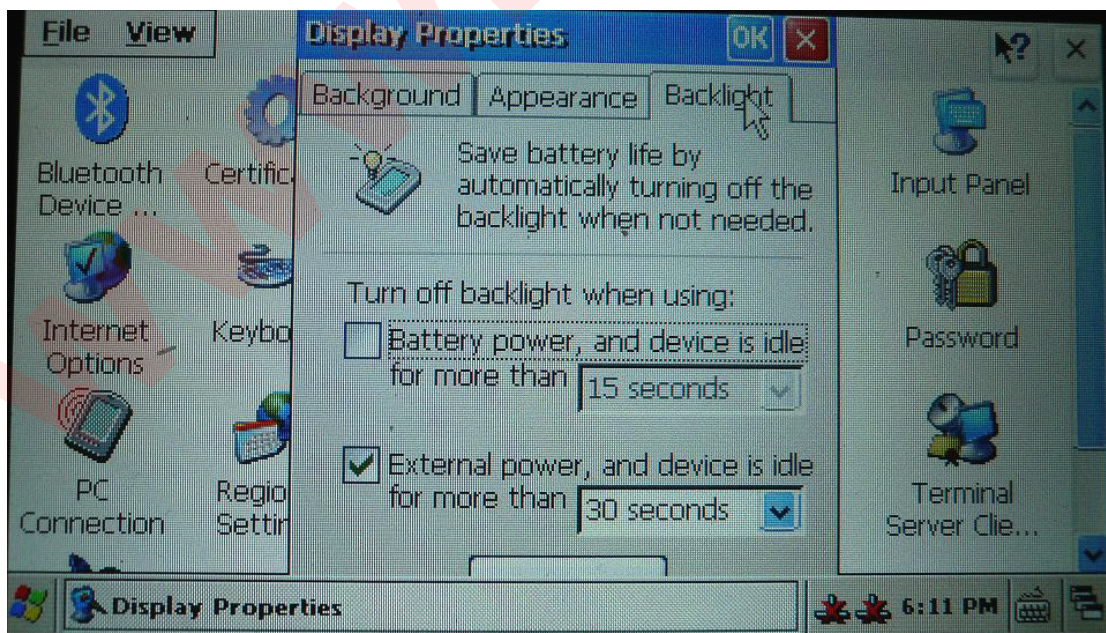
Click on "Advanced"

The backlight control window will pop up

You can slide the slider to adjust the backlight. Click on "close" to return to your previous interface

6.4.16   Watchdog

Watchdog is one of the most common features in the embedded systems. To test watchdog function, you can click on the "friendlyarm" program group, double-click "Watchdog",as shown below:

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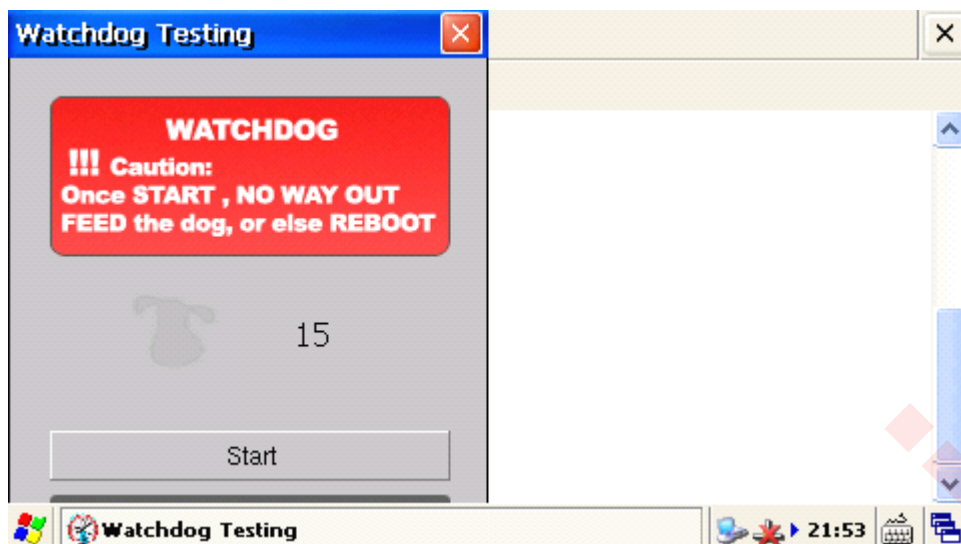
Please   note the tips of the red zone before click "Start"

Once Start,no way out feed the dog,or else reboot. The time is 15 seconds.

In order to express the action of feeding the dog, when feed the dog we threw a bone to it, if you keep on clicking the "Feed" button, it eats bones all the time,   the system will also don't reset , as shown:

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