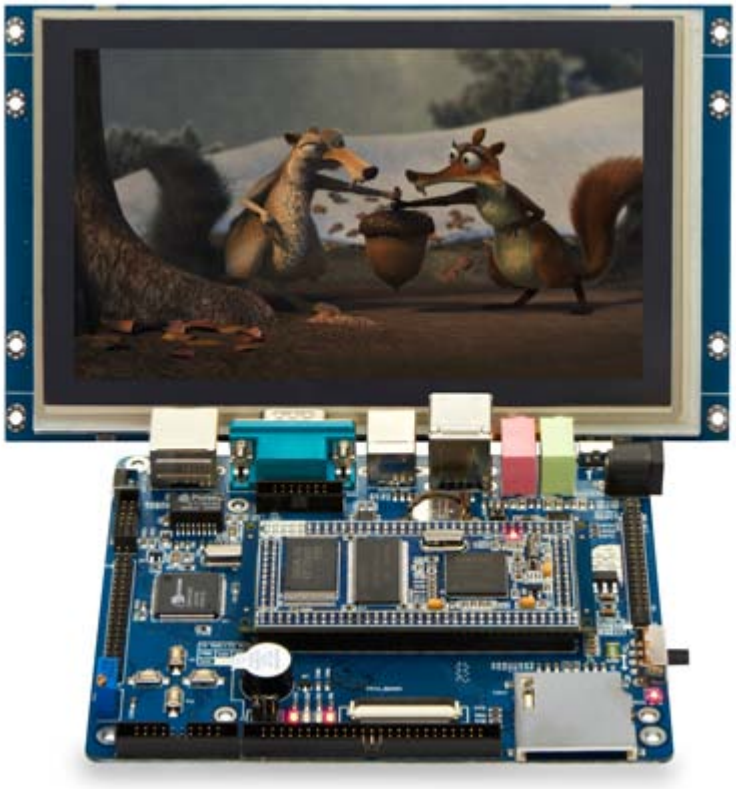
EM2440-III Hardware Manual



Boardcon Technology Limited
www.boardcon.com

1. Introduction

1.1. About this Manual

This manual is intended to provide the user with an overview of the board and benefits, complete features specifications, and set up procedures. It contains important safety information as well.

1.2. Feedback and Update to this Manual

To help our customers make the most of our products, we are continually making additional and updated resources available on the Boardcon website (www.boardcon.com , www.armdesigner.com).

These include manuals, application notes, programming examples, and updated software and hardware. Check in periodically to see what's new!

When we are prioritizing work on these updated resources, feedback from customers is the number one influence, If you have questions, comments, or concerns about your product or project, please no hesitate to contact us at support@armdesigner.com.

1.3. Limited Warranty

Boardcon warrants this product to be free of defects in material and workmanship for a period of one year from date of buy. During this warranty period Boardcon will repair or replace the defective unit in accordance with the following process:

A copy of the original invoice must be included when returning the defective unit to Boardcon. This limited warranty does not cover damages resulting from lighting or other power surges, misuse, abuse, abnormal conditions of operation, or attempts to alter or modify the function of the product.

This warranty is limited to the repair or replacement of the defective unit .In no event shall Boardcon be liable or responsible for any loss or damages, including but not limited to any lost profits, incidental or consequential damages, loss of business, or anticipatory profits arising from the use or inability to use this products.

Repairs make after the expiration of the warranty period are subject to a repair charge and the cost of return shipping. Please contact Boardcon to arrange for any repair service and to obtain repair charge information.

Content

1 EM2440-III Introduction

1.1 Summary

EM2440-III SBC offers true rapid development solutions by providing all the necessary ingredients to jump start embedded designs. The board includes the ARM9 MINI2440 module and Carrier Board, pre-installed Windows Embedded CE or Linux OS. The mother board integrates a rich set of peripherals and interfaces including Ethernet, USB Host & Device, Camera, Serial ports, Audio, LCD, Keyboard, SD/MMC, Buttons, LEDs and etc.

1.2 S3C2440A Features

SAMSUNG"s S3C2440A is designed to provide hand-held devices and general applications with low-power, and high-performance microcontroller solution in small die size. To reduce total system cost. The S3C2440A is developed with ARM920T core, 0.13um CMOS standard cells and a memory complier. Its lowpower, simple, elegant and fully static design is particularly suitable for cost- and power-sensitive applications. It adopts a new bus architecture known as Advanced Micro controller Bus Architecture (AMBA).

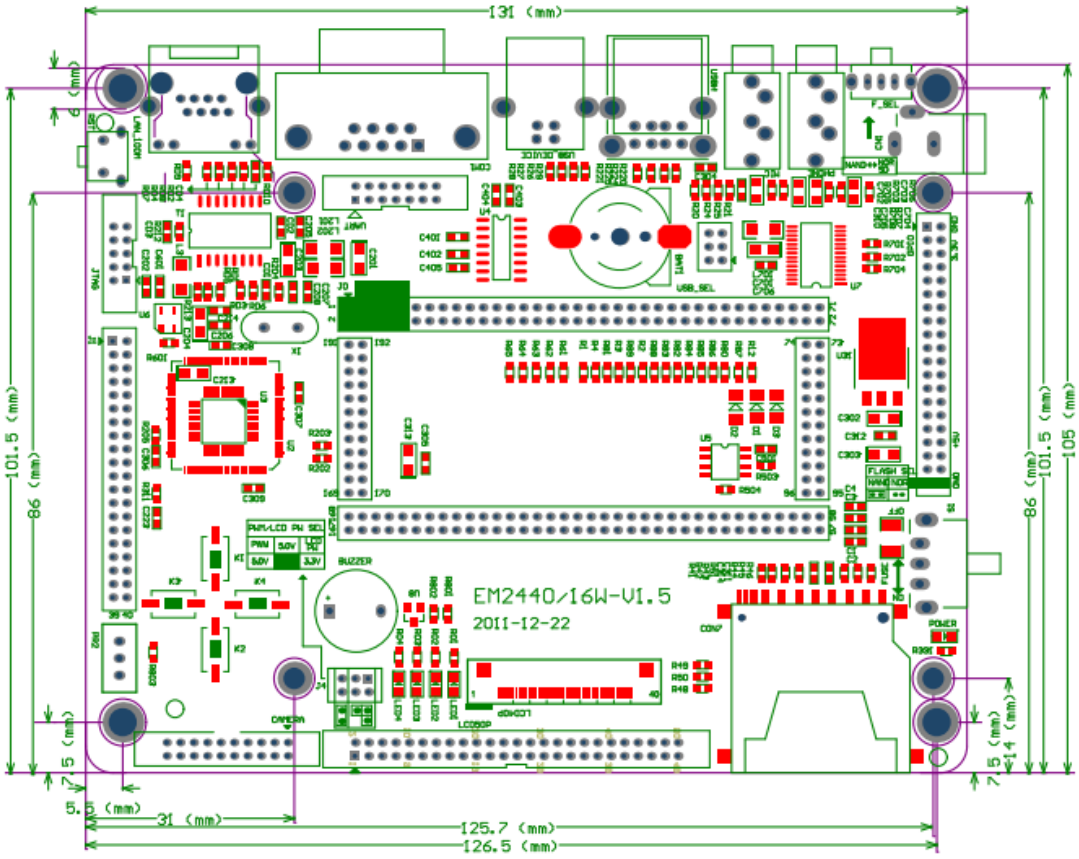
Features:

- Around 1.2V internal, 1.8V/2.5V/3.3V memory, 3.3V external I/O microprocessor with 16KB I-Cache/16KB DCache/MMU
- External memory controller (SDRAM Control and Chip Select logic)
- Supports various types of ROM for booting(NOR/NAND Flash, EEPROM, and others).
- LCD controller (up to 4K color STN and 256K color TFT) with LCD-dedicated DMA
- 4-ch DMA controllers with external request pins
- 3-ch UARTs (IrDA1.0, 64-Byte Tx FIFO, and 64-Byte Rx FIFO)
- 2-ch SPIs
- IIC bus interface (multi-master support)
- IIS Audio CODEC interface
- AC'97 CODEC interface
- SD Host interface version 1.0 & MMC Protocol version 2.11 compatible
- 2-ch USB Host controller / 1-ch USB Device controller (ver 1.1)
- 4-ch PWM timers / 1-ch Internal timer / Watch Dog Timer
- 8-ch 10-bit ADC and Touch screen interface
- RTC with calendar function
- Camera interface (Max. 4096 x 4096 pixels input support. 2048 x 2048 pixel input support for scaling)
- 130 General Purpose I/O ports / 24-ch external interrupt source
- Power control: Normal, Slow, Idle and Sleep mode
- On-chip clock generator with PLL

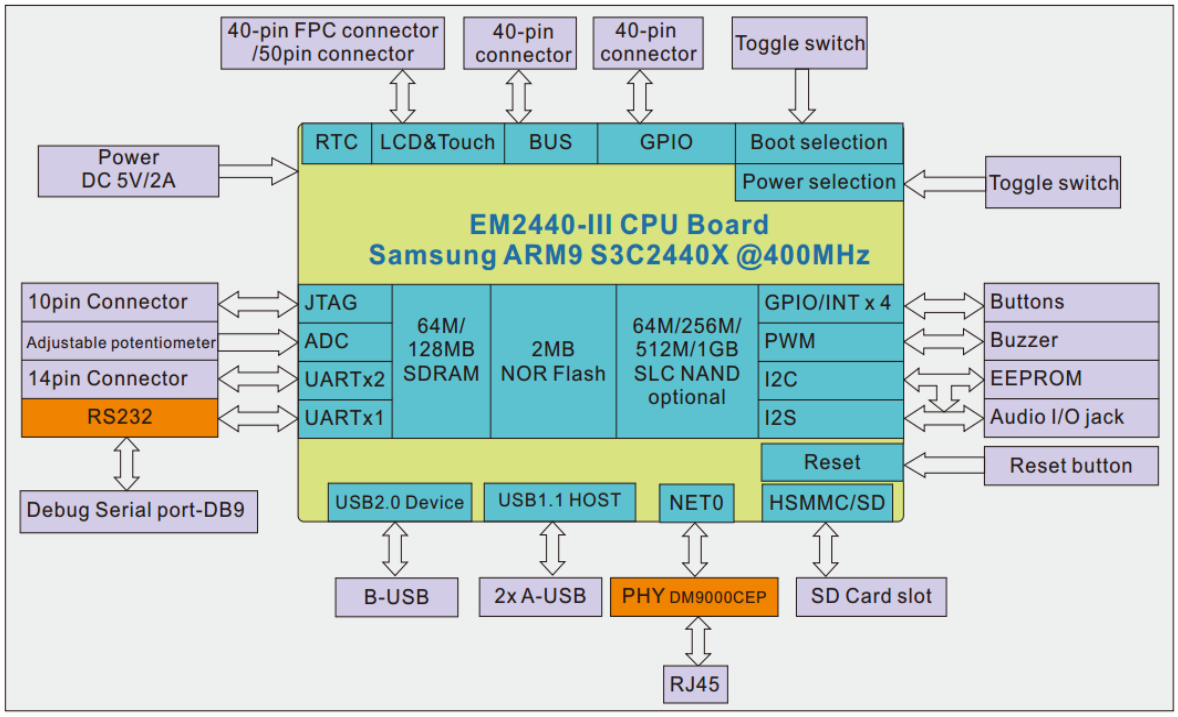
1.3 EM2440-III Specifications

Feature	Specifications
CPU	Samsung ARM9 S3C2440A ARM920T @400MHz
SDRAM	64MB/128MB optional
NAND Flash	256MB/512MB/1GB optional
CPU Power	3.3V power supply for CPU board
Connector	DC-2.0mm pitch board-to-board connectors
CPU board dimension	37mm x 74mm
Serial Ports (UARTs)	COM-0 - RS232, five-wire DB9 RS232 serial port COM-1/2/3, three-wire available via 2mm pitch 3 pins
LCD	The LCD port integrated 4-wire resistor touch screen port. The board comes with driver for 4.3- and 7-inch TFT LCD (the resolution is 800*600). 10.1-inch LCD is also available.
Ethernet	Davicom DM9000EP/CEP MAC & PHY, 10/100BaseT, Activity LED's
USB	2x USB1.1 Host, 1x USB2.0 Device
JTAG	1x 2mm pitch 10 pins JTAG Port
Audio codec	Adopt WM8731/UDA1341 Audio chip, Audio input and output slot
ADC	Adjustable resistor is connected with pins of ADC to check analog/digital change
RTC	Real Time Clock, powered by external lithium battery
Buzzer	On-board PWM function test unit
Device support	1x SD/MMC card socket, supports Multimedia Card, Secure Digital and Secure Digital I/O communications protocols up to 2GB
GPIO	1x 40-pin GPIO Expansion Interface
BUS	1x 40-pin BUS Expansion Interface
Camera(optional)	1x 2mm pitch 20-pin Interface, 1.3 M pixels CMOS camera interface
LED	4x Status LED
Buttons	4 Programmable User Buttons
Power in	DC 5V/2A
Base board dimension	105mm x 131mm

1.4 PCB Dimension



1.5 Block Diagram

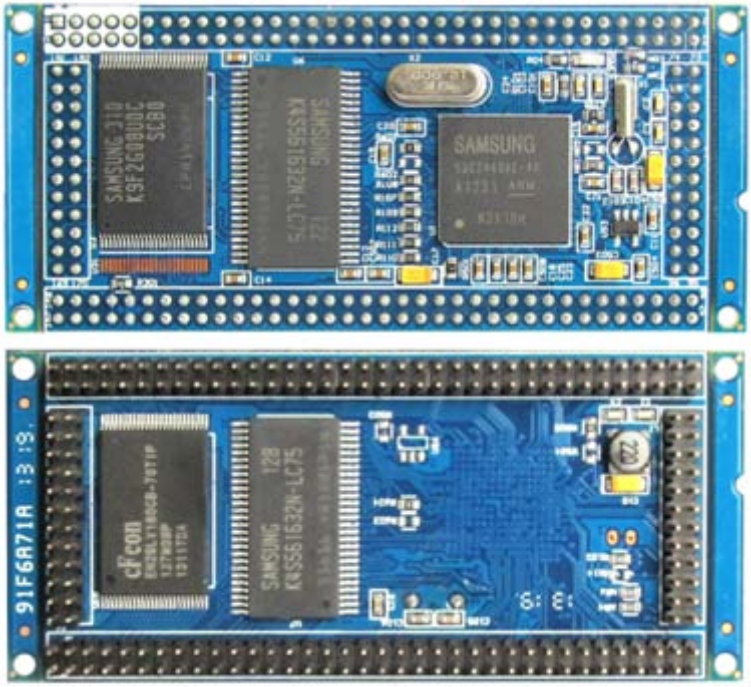


1.6 Motherboard Power meter

Support voltage	5v/2A				
System	Connected devices	Electric current(A)	System	Connected devices	Electric current(A)
Linux	5v power	0.21	Linux	Power, 7 inch resistive screen	0.66
Linux	Power, sd card, play video, U disk, debug serial, Ethernet, 7inch LCD, headphone	0.99	Wince	5v power	0.19
Wince	Power, 7 inch resistive screen	0.66	Wince	Power, sd card, play video, U disk, debug serial, Ethernet, 7inch LCD, headphone	0.99

1.7 CPU Module Introduction

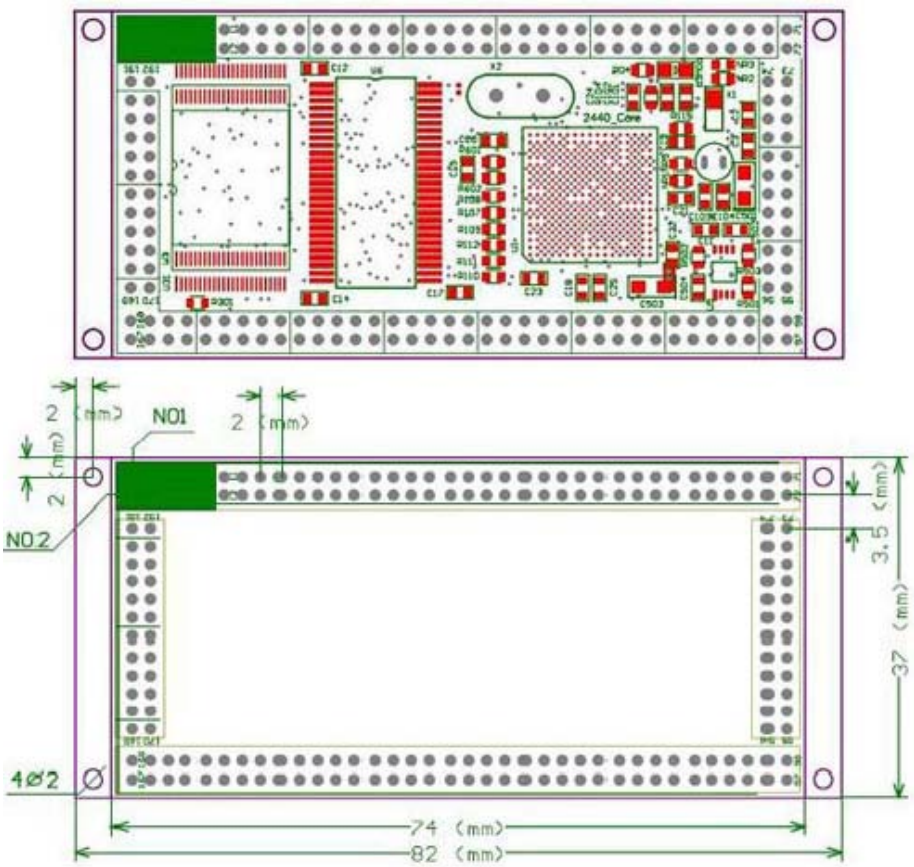
The EM2440-III CPU board – MINI2440 is designed specifically for business users who develop consumer electronics, industrial control, vehicle navigation, PDA and other electronic products.



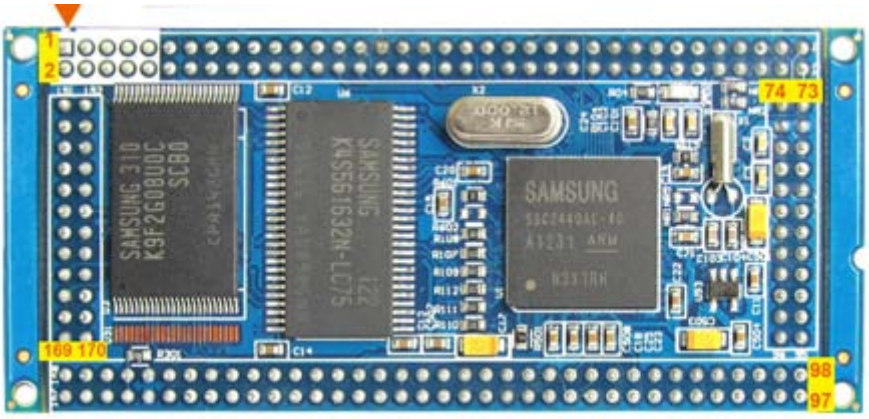
Board Dimension

* Board size: 74mm x 37mm
* Pin to Pin space: 2mm
* Pin number: (J1A +J1C) x 24 + (J1B+J1D) x 72, total 192 pins

MINI2440 PCB Dimension



Pin Definition

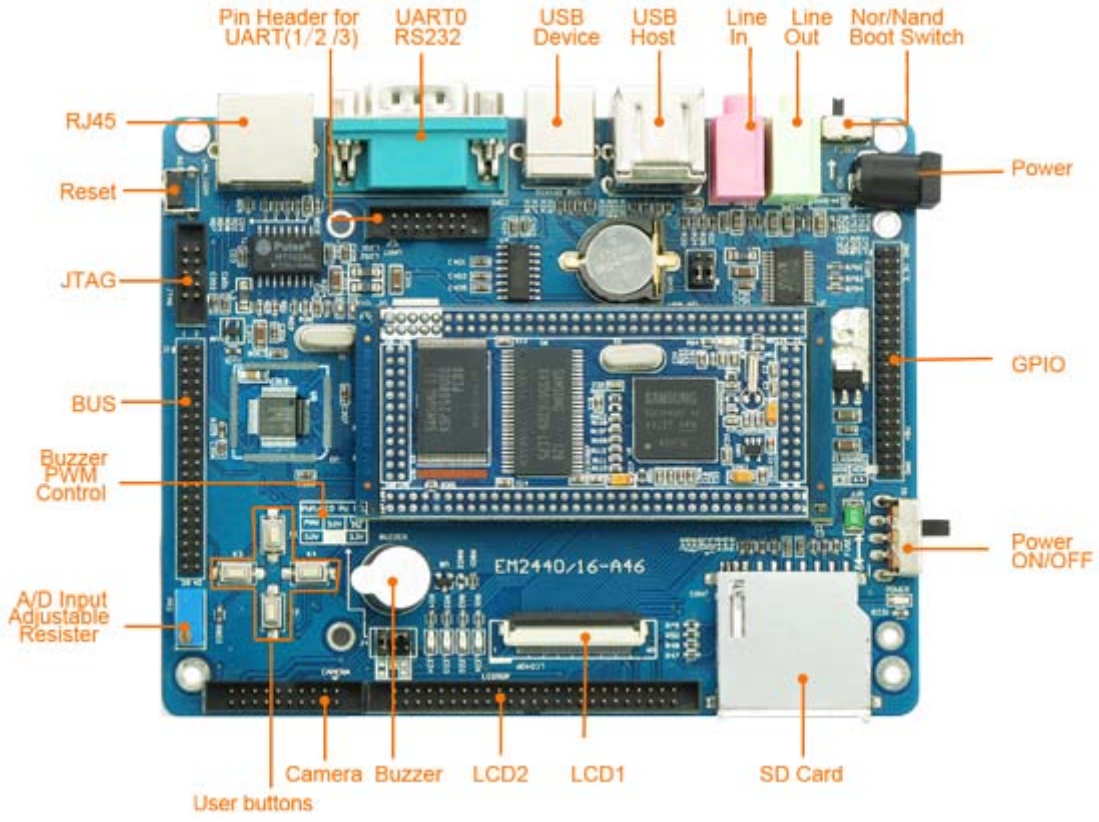


Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	DATA6	2	DATA7	3	ADDR7	4	ADDR8
5	ADDR5	6	ADDR6	7	ADDR3	8	ADDR4
9	ADDR1	10	ADDR2	11	DATA30	12	DATA31
13	DATA28	14	DATA29	15	DATA26	16	DATA27
17	DATA24	18	DATA25	19	DATA22	20	DATA23
21	DATA20	22	DATA21	23	DATA18	24	DATA19
25	DATA16	26	DATA17	27	nTRST	28	nRESRT
29	TDO	30	TDI	31	TCK	32	TMS

33	RXD2/nCTS1/ GPH7	34	TXD2/nRTS1/GPH6	35	RXD1/GPH5	36	TXD1/GPH4
37	RXD0/GPH3	38	TXD0/GPH2	39	nRTS0/GPH1	40	nCTS0/GPH0
41	EINT0/GPF0	42	EINT1/GPF1	43	EINT2/GPF2	44	EINT3/GPF3
45	EINT4/GPF4	46	EINT5/GPF5	47	EINT6/GPF6	48	EINT7/GPF7
49	EINT8/GPG0	50	EINT11/nSS1/GPG3	51	EINT14/SPIMOSI1/GPG6	52	EINT13/SPIMISO1/GPG5
53	EINT19/TCLK1/ GPG11	54	EINT15/SPICLK1/ GPG7	55	EINT18/nCTS1/GPG10	56	EINT9/GPG1
57	EINT20/GPG12	58	VDD_RTC	59	DP1/PDP0	60	AIN3
61	DN1/PDN0	62	AIN2	63	DN0	64	AIN1
65	DP0	66	AIN0	67	EINT13/SPIMISO1/GPG5	68	EINT10/nSS0/GPG2
69	SPICLK0/GPE13	70	SPIMOSI0/GPE12	71	EINT22/GPG14	72	EINT21/GPG13
73	Vref	74	EINT23/GPG15	75	OM2	76	OM3
77	OM0	78	OM1	79	EINT16/GPG8	80	SDDAT2/GPE9
81	SDDAT3/GPE10	82	SDCMD/GPE6	83	SDCLK/GPE5	84	SDDAT0/GPE7
85	SDDAT1/GPE8	86	UEXTCLK/GPH8	87	TCLK0/GPB4	88	CDCLK/ GPE2
89	I2SLRCK/ GPE0	90	I2SSCLK/ GPE1	91	TOUT3/GPB3	92	TOUT2/GPB2
93	I2SSDI/ GPE3	94	I2SSDO/ GPE4	95	EINT12/LCD_PWREN/GPG4	96	XP/AIN7
97	XM/AIN6	98	YP/AIN5	99	YM/AIN4	100	VCLK/GPC1
101	VLINE/GPC2	102	VFRAME/GPC3	103	VM/GPC4	104	IICSCL/GPE14
105	IICSDA/GPE15	106	VD23/nSS0/GPD15	107	VD22/nSS1/GPD14	108	VD21/ GPD13
109	VD20/ GPD12	110	VD19//GPD11	111	VD18/SPICLK1/GPD10	112	VD17/SPIMOSI1/ GPD9
113	VD16/SPIMISO1 /GPD8	114	VD15/GPD7	115	VD14/GPD6	116	VD13/ GPD5
117	VD12/GPD4	118	VD11/GPD3	119	VD10/GPD2	120	VD9/GPD1
121	VD8/GPD0	122	VD7/GPC15	123	VD6/GPC14	124	VD5/GPC13
125	VD4/GPC12	126	VD3/GPC11	127	VD2/GPC10	128	VD1/GPC9
129	VD0/GPC8	130	nXDACK0/GPB9	131	nXDREQ0/GPB10	132	nXBACK/GPB5
133	nXBREQ/GPB6	134	nXDACK1/GPB7	135	nXDREQ1/GPB8	136	TOUT1/GPB1
137	TOUT0/GPB0	138	CAMRESET/GPJ12	139	CAMVSYNC/GPJ9	140	CAMHREF/GPJ10
141	CAMPCLK/GPJ8	142	CAMCLKOUT/GPJ11	143	CAMDATA0/GPJ0	144	CAMDATA1/GPJ1
145	CAMDATA2/GPJ2	146	CAMDATA3/GPJ3	147	CAMDATA4/GPJ4	148	CAMDATA5/GPJ5
149	CAMDATA6/GPJ6	150	CAMDATA7/GPJ7	151	nWAIT	152	nGCS1/GPA12

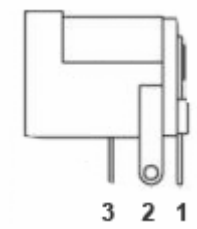
153	nGCS2/GPA13	154	nGCS3/GPA14	155	nGCS4/GPA15	156	nGCS5/GPA16
157	nGCS7	158	nBE1	159	GND	160	GND
161	3.3V	162	3.3V	163	DATA8	164	DATA9
165	DATA10	166	DATA11	167	DATA12	168	DATA13
169	DATA14	170	DATA15	171	ADDR24 /GPA9	172	ADDR0/GPA0
173	nWE	174	nOE	175	ADDR20/GPA5	176	ADDR19/GPA4
177	ADDR18/GPA3	178	ADDR17/GPA2	179	ADDR16/GPA1	180	ADDR15
181	ADDR14	182	ADDR13	183	ADDR12	184	ADDR11
185	ADDR10	186	ADDR9	187	DATA0	188	DATA1
189	DATA2	190	DATA3	191	DATA4	192	DATA5

2 Peripherals Introduction



2.1 Power (CN1)

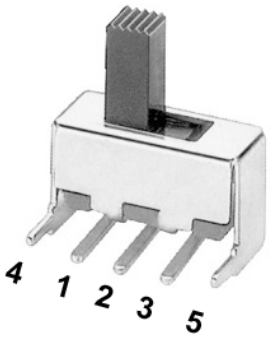
Power supply: DC 5V/2A (The Input voltage must be less than 7V).



Pin	Signal	Description	Pin	Signal	Description
1	VDD5V	Main power supply. DC 5V power in, connect to SW-SPDT	2	GND	Ground
3	GND	Ground			

2.2 Power switch (POWER)

The power switch is a toggle switch, controlling the evaluation board power ON/OFF.

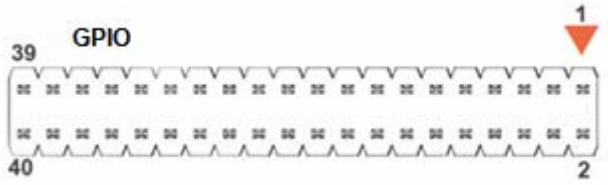


Pin	Signal	Description	Pin	Signal	Description
1	VDD5V	SW SPDT switch 1 and 2, Connect to FUSE, power to board	2	VDD5V	Connect to CN1 Pin1
3	NC	NC	4	GND	Ground
5	GND	Ground			

2.3 GPIO

The GPIO is a 40-pin header connector. The pins can be defined as

- Data input / output.
- Interrupt generation.



Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	GND	Ground
3	NC	NC	4	NC	NC
5	VDD33V	3.3V voltage	6	VDD33V	3.3V voltage
7	EINT4	Interrupt 4	8	EINT3	Interrupt 3
9	EINT8	Interrupt 8	10	EINT11	Interrupt 11
11	EINT14	Interrupt 14	12	EINT13	Interrupt 13
13	EINT19	Interrupt 19	14	EINT15	Interrupt 15
15	EINT18	Interrupt 18	16	EINT9	Interrupt 9
17	TOUT1	PWM out 1	18	TOUT0	PWM out 0
19	AIN2	AIN2	20	AIN3	AIN3
21	AIN0	AIN0	22	AIN1	AIN1
23	nSS_SPI	Nss_SPI	24	SPIMISO	SPI Master data in; slave data out
25	SPIMOSI	SPI Master data out; slave data in	26	SPICLK	SPI clock
27	GPG13	Gate Pulse Generator 13	28	GPG14	Gate Pulse Generator 14
29	nLED_3	nLED_3	30	nLED_4	nLED_4
31	nLED_1	nLED_1	32	nLED_2	nLED_2
33	VDD5V	5V voltage	34	VDD5V	5V voltage
35	I2CSDA	I2C data	36	I2CSCL	I2C clock
37	GND	Ground	38	GND	Ground
39	OM0	NAND/NOR Flash select	40	GND	Ground

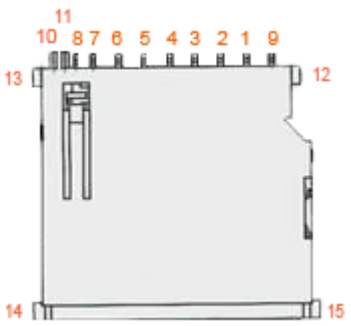
2.4 SD Card (CON7)

The SD card is used as an external storage device. The MMC controller interface supports up to 4-bit transfer modes. MMC is always accessible through the carrier board interface.

Features:

- Low voltage consumption.
- Support hot-plug.
- Support SD mode and SPI mode.

CON7



Pin	Signal	Description	Pin	Signal	Description
1	SDDATA3	SD data bit 3	2	SDCMD	SD Command
3	GND	Ground	4	VDD33V	Power Positive 3.3V
5	SD_CLK	Interface clock	6	GND	Ground
7	SDDATA0	SD data bit 0	8	SDDATA1	SD data bit 1
9	SDDATA2	SD data bit 2	10	WP_SD_1	SD Write Protect
11	nCD_SD	SD Card Detect	12	GND	Ground
13	GND	Ground	14	GND	Ground
15	GND	Ground			

2.5 LCD (40P FPC, 50P Header)

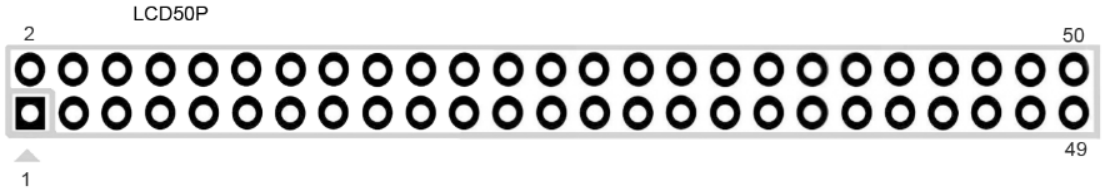
There are two LCD interfaces of EM2440, one is 40P FPC and the other is 50P header.

The board comes with driver for 4.3- and 7-inch resistive LCD, user also can choose other size of LCD&touchscreen.

40Pin LCD connector

Pin	Signal	Pin	Signal
1	VDD_IN	2	VDD_IN
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	LCD_PWR
31	I2CSDA	32	I2CSCL
33	VM	34	VFRAME
35	VLINE	36	VCLK
37	TSXM	38	TSXP
39	TSYM	40	TSYP

50Pin LCD connector

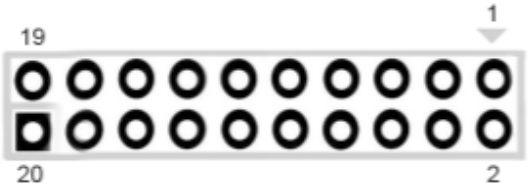


Pin	Signal	Pin	Signal
1	VDD _N	2	VDD _N
3	VDD _N	4	GND
5	NC	6	VD0
7	VD1	8	VD2
9	VD3	10	VD4
11	VD5	12	VD6
13	VD7	14	VD8
15	VD9	16	VD10
17	VD11	18	GND
19	VD12	20	VD13
21	VD14	22	VD15
23	VD16	24	VD17
25	VD18	26	VD19
27	VD20	28	VD21
29	VD22	30	VD23
31	GND	32	LCD_PWR
33	I2CSDA	34	I2CSCL
35	NC	36	VM
37	VFRAME	38	VLINE
39	VCLK	40	NC
41	NC	42	GND
43	TSXM	44	TSXP
45	NC	46	GND
47	TSYM	48	TSYP
49	NC	50	GND

2.6 Camera

Camera interface is a 2mm pitch 20-pin connector.

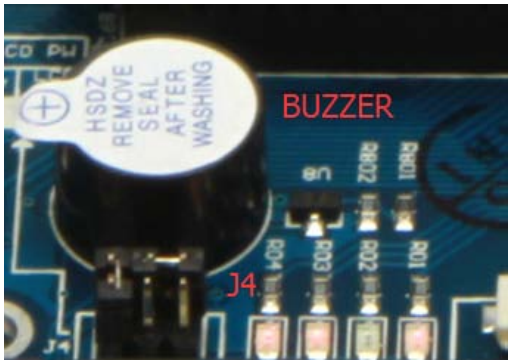
Boardcon offers optional 1.3M pixels camera module (OV9650) for user.

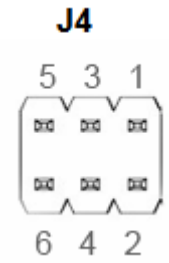


Pin	Signal	Description	Pin	Signal	Description
1	I2CSDA	I2C serial data	2	I2CSCL	I2C serial clock
3	EINT19	External Interrupt	4	CAMRST	Camera reset
5	CAM_PCLK	Camera Pixel clock	6	CAM_HREF	Camera Horizontal sync
7	CAM_VSYNC	Camera Vertical sync	8	CAMCLK	Camera clock
9	CAMDATA7	Camera data	10	CAMDATA6	Camera data
11	CAMDATA5	Camera data	12	CAMDATA4	Camera data
13	CAMDATA3	Camera data	14	CAMDATA2	Camera data
15	CAMDATA1	Camera data	16	CAMDATA0	Camera data
17	VDD5V	5V power in	18	VDD33V	3.3V power in
19	GND	Ground	20	GND	Ground

2.7 PWM (J4)

The buzzer is active and will sound when a DC voltage is applied. Connect Pin 5 and 6 with Jumper to control PWM out.





J4

Pin1&3，Pin1&2 is used to power LCD (just control the backlight). The default select Pin1&3.

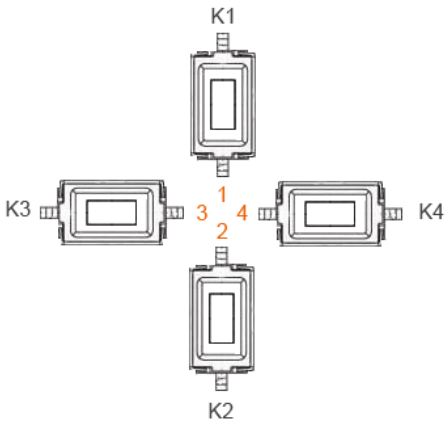
Pin	Signal	Description	Pin	Signal	Description
1	VDD_IN	Supply voltage	2	VDD33V	3.3V voltage
3	VDD5V	5V voltage	4	NC	NC
5	NetJ4_5	Connect to buzzer	6	VDD5V	5V voltage

BUZZER

Pin	Signal	Description	Pin	Signal	Description
1	NetJ4_5	Voltage in. Connect to pin 5 of J4	2	NetU8_C	Control PWM. Connect to U3_ Collector

2.8 Buttons (K1/2/3/4, RST)

On-board 4 user buttons (User-Defined) and 1 reset button.



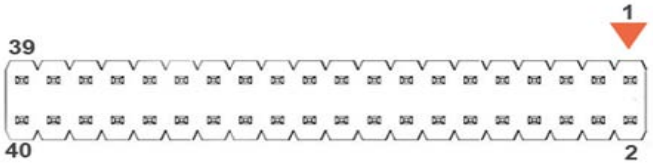
Pin	Signal	Description	Pin	Signal	Description
1	EINT1	Interrupt 1	2	EINT2	Interrupt 2
3	EINT3	Interrupt 3	4	EINT4	Interrupt 4
K1	GND	Ground	K2	GND	Ground
K3	GND	Ground	K4	GND	Ground

The RST button is a Side Tact Switch. The board adopts MAX811 as the Reset chip. If the system voltage is lower than the threshold (2.93V), MAX811S will reset the system immediately.

Pin	Signal	Description	Pin	Signal	Description
1	NetU_3(MR)	Connect to MAX811	2	GND	Ground

2.9 BUS (J1)

The BUS is a 40pin header connector. There are 8 address lines (address 0-6 and address 24), 16 data lines (data 0-15), 4 interrupts and 4 chip-select signals. The Bus supports IDE protocol and extended functionality.



Pin	Signal	Description	Pin	Signal	Description
1	LADDR1	address 1	2	GPA0/LADDR0	GPIO port/address 0
3	LADDR3	address 3	4	LADDR2	address 2

5	LADDR5	address 5	6	LADDR4	address 4
7	BA0/LADDR 24	address 24	8	LADDR6	address 6
9	LDATA6	Data 6	10	LDATA7	Data 7
11	LDATA4	Data 4	12	LDATA5	Data 5
13	LDATA2	Data 2	14	LDATA3	Data 3
15	LDATA0	Data 0	16	LDATA1	Data 1
17	nRESET	Bus reset	18	nWAIT	Request an extension of the current bus cycle
19	LnOE	Read Enable	20	LnWE	Write Enable
21	LDATA14	Data 14	22	LDATA15	Data 15
23	LDATA12	Data 12	24	LDATA13	Data 13
25	LDATA10	Data 10	26	LDATA11	Data 11
27	LDATA8	Data 8	28	LDATA9	Data 9
29	nGCS3	chip select signal 3	30	nGCS5	chip select signal 5
31	nIDE_CS1	chip select signal 1	32	nIDE_CS2	chip select signal 2
33	EINT2	Interrupt 2	34	EINT1	Interrupt 1
35	EINT6	Interrupt 6	36	EINT5	Interrupt 5
37	IDE_DACK	IDE DACK	38	IDE_DREQ	IDE DREQ
39	VDD5V	5V voltage	40	GND	Ground

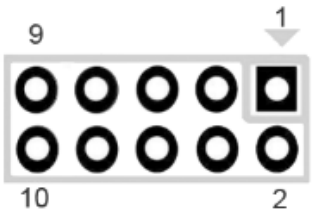
2.10 JTAG

The JTAG is a 2mm pitch 10-pin connector. If there is no u-boot on board, user needs to download u-boot to Nor Flash via JTAG. Connect JTAG and PC parallel port with JTAG cable ,JTAG also can be used for single-step debugging combined with the emulator.

Note: Remove the JTAG cable after use.

Features

- IEEE P1149.1, 1149.6 (standard JTAG) interface to off-chip test and development equipment
- Debug-related control and status



Pin	Signal	Description	Pin	Signal	Description
1	VDD33V	3.3V power in	2	VDD33V	3.3V power in
3	nTRST	Test logic reset	4	nRESET	Test logic reset
5	TDI	Test data input	6	TDO	Test data output
7	TMS	Test mode select	8	GND	Ground
9	TCK	Test clock	10	GND	Ground

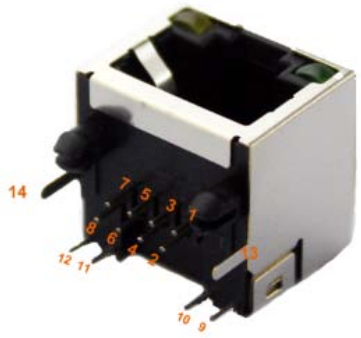
2.11 Ethernet (LAN_100M)

EM2440-III incorporates a full-featured 10/100M Ethernet interface. The platform adopts DM9000CEP as the Ethernet chip.

Features:

- 10/100 BASE-T IEEE 802.3 compliant
- IEEE 802.3u compliant Auto-Negotiation
- Integrated IEEE 1588 time stamping module (inside the MAC).
- Automatic channel swap (ACS)
- Full- and Half-duplex
- Automatic MDI/MDIX crossover
- Automatic polarity correction
- Activity and speed indicator LED controls

The EM2440-III can download the images in TFTP mode via Ethernet.



Pin	Signal	Description	Pin	Signal	Description
1	TD+	Data send +	2	TD-	Data send -
3	RD+	Data receive +	4	AGND	Ground
5	AGND	Ground	6	RD-	Data receive -
7	AGND	Ground	8	AGND	Ground
9	LAND2_LNK	Detect link	10	VDD33V	3.3V voltage
11	LAND2_SPD	Detect speed	12	VDD33V	3.3V voltage
13	GND	Ground	14	GND	Ground

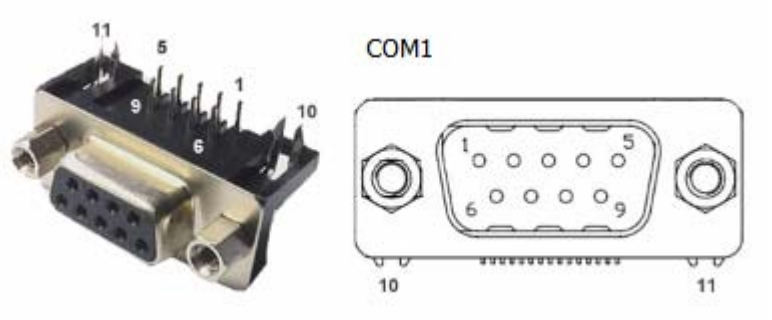
2.12 Serial port (COM1, UART)

On-board a RS232 port.

Features:

- 32-entry FIFO for receiver and 32-entry FIFO for transmitter
- Programmable baud rate of up to 250K bit/s
- The serial port operates at RS232 voltage levels.

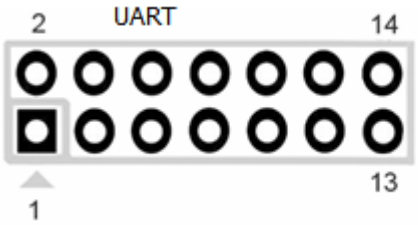
The RS232 is used for debugging. It is used to input and display interactive command, view system boot information and transfer files between the platform and PC.



Pin	Signal	Description	Pin	Signal	Description
1	NC	NC	2	RSTXD0	RS232 Transmit Data
3	RSRXD0	RS232 Receive Data	4	NC	NC
5	GND	Ground	6	NC	NC
7	RSCTS0	Clear to Send	8	RSRTS0	Request to Send
9	NC	NC	10	GND	Ground
11	GND	Ground	12		

The UART is a 14-pin connector and can be extended to 3x three-wire serial ports.

One serial port is multiplexed with COM1. The UART is use for GPS in EM2440-III by default.



Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	GND	Ground
3	VDD5V	5V voltage	4	VDD5V	5V voltage
5	TXD2	Serial 2 Transmit Data	6	RXD2	Serial2 Receive Data
7	TXD1	Serial 1 Transmit Data	8	RXD1	Serial1 Receive Data
9	TXD0	Serial 1 Transmit Data	10	RXD0	Serial0 Receive Data
11	nCTS0	Clear to Send 0	12	nRTS0	Request to Send 0
13	VDD33V	3.3V voltage	14	VDD33V	3.3V voltage

2.13 USB2.0 Device (USB_DEVICE)

The USB2.0 device is a type-B USB. It is use to download image.

Features:

• Supports USB 2.0 High Speed (480Mbps), Full Speed (12Mbps) and Low Speed (1.5Mbps) operation in host mode

• Supports USB 2.0 High Speed (480 Mbps) and Full Speed (12 Mbps) operation in peripheral mode.

Pin	Signal	Description	Pin	Signal	Description
1	VBUS	USB_5V	2	D-	DND1/GND
3	D+	DPD1/USB_EN/EINT2	4	GND	Ground
5	GND	Ground	6	GND	Ground

2.14 USB1.1 HOST (USBH)

USBH is a type A Double-USB1.1 Host. It supports full speed (12Mbps) and low speed (1.5Mbps) operation. It can be used to connect USB mouse, U disk and other USB devices.

Pin	Signal	Description	Pin	Signal	Description
1	VDD5V	USB Power. DC 5V	2	DN0	USB host data 0(-)
3	DP0	USB host data 0(+)	4	GND	Ground
5	VDD5V	USB Power. DC 5V	6	DNH1	USB host data 1(-)
7	DPH1	USB host data 0(+)	8	GND	Ground
9	GND	Ground	10	GND	Ground
11	GND	Ground	12	GND	Ground

The on-board three USB ports (one USB device and two USB host), only two USB are active at one time. The USB can be specified by operating the USB_SEL.

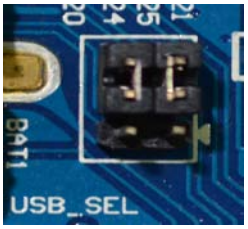
Pin	Signal	Description	Pin	Signal	Description
1	DND1	USB device data1(-)	2	DPD1	USB device data1(+)

3	DN1	USB host data 1(-)	4	DP1	USB host data 1(+)
5	DNH1	USB host data 1(-)	6	DPH1	USB host data 0(+)

How to select USB:

1. USB device and Bottom_USB host are active. (connect pin1&3, pin2&4)

2. Double-USB host are active (Bottom_USB host and Top_USB host). (connect pin3&5, pin4&6)



2.15 Audio I/O (MIC, PHONE)

The development board adopts IIS interface chip WM8731, provides stereo audio output (Green, 3.5mm audio jack) and MIC recording (Pink 33.5mm audio jack).

Features:

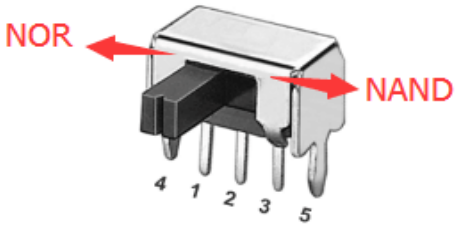
- Low power
- Integrated ADC and DAC
- IIS transfer audio data
- Stereo output, support recording

MIC					
Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	MICIN	MIC input
3	MICIN	MIC input	10	MICIN	MIC input
11	MICIN	MIC input			
PHONE					

Pin	Signal	Description	Pin	Signal	Description
1	GND	Ground	2	LHPOUT	Left Channel Headphone Output
3	RHPOUT	Right Channel Headphone Output	10	LHPOUT	Left Channel Headphone Output
11	RHPOUT	Right Channel Headphone Output			

2.16 Boot Switch (F_SEL)

F_SEL is a Toggle Switch used to set the boot mode. If turn to the left, it is booting from NOR FLASH, otherwise, booting from NAND FLASH.



Pin	Signal	Description	Pin	Signal	Description
1	NC	NC	2	OM0	Boot select
3	GND	Ground	4	GND	Ground
5	GND	Ground			

2.17 Backup battery (BAT1)

The backup battery (3V) is used to ensure the RTC (frequency 32.768KHz) is still able to work after power off. Lithium cell model: CR1220.

3 Product Configurations

3.1 Standard Contents

• EM2440-III Single board computer x1
• CD-ROM (Linux BSP, WINCE BSP, Documents, tools, Schematic Drawing, datasheets) x1
• Ethernet cable x1
• Serial Cable x1
• USB Cable x1
• 5V/2A DC power adaptor x1

3.2 Optional Parts

- WiFi Module
- GPS Module
- GPRS Module
- Camera Module
- LCD Module (4.3-, 7-, 10.1-inch)
- VGA Module
- AV Module
- Printer