



i.MX51W + 8"LCD Development Platform Introduction





Please visit the following website for more information:

--- i.MX51L: based on i.mx51 with Linux OS development platform:

http://www.yuan-ying.com/product_catalog/i.MX51L.htm

--- i.MX51W: based on mx51 with Wince6.0 OS development platform:

http://www.yuan-ying.com/product_catalog/i.MX51W.htm

--- i.MX51A: based on i.mx51 with Android2.2 OS development platform:

http://www.yuan-ying.com/product_catalog/i.MX51A.htm

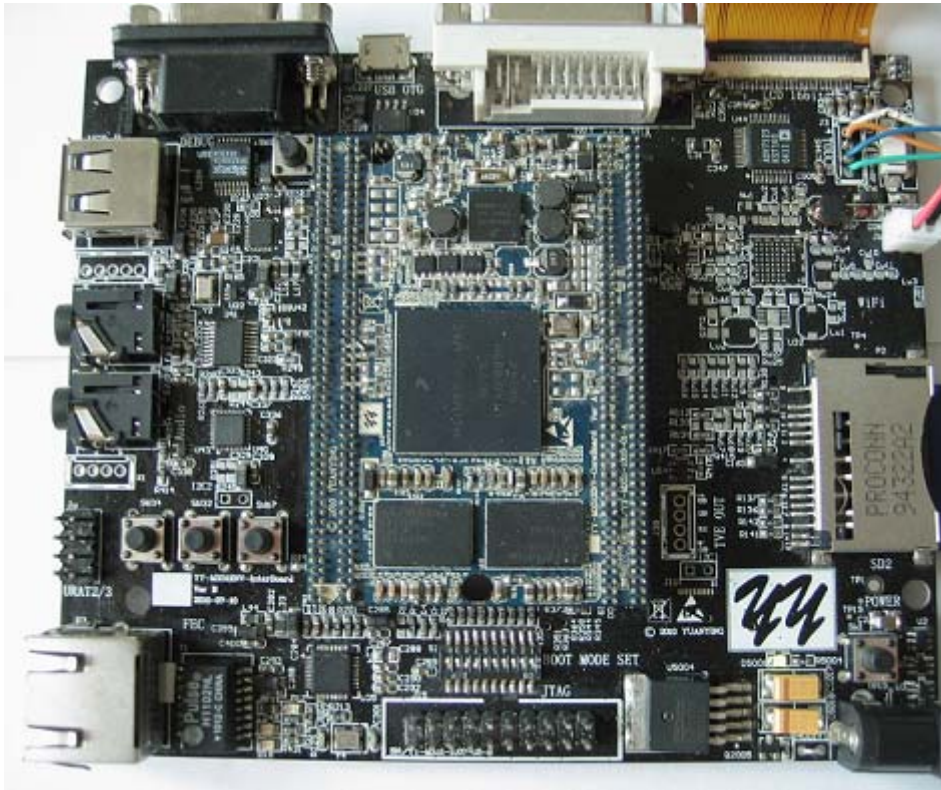
--- i.MX51U: based on i.mx51 with Ubuntu OS development platform:

http://www.yuan-ying.com/product_catalog/i.MX51U.htm





◆ System Introduction:



Starting from Oct., 2009, Yuan-ying Technology invest to design MX51 platform, by now we have successfully launched i.MX25 and i.MX35 development platform and the related turn key solution. To meet the market demand and the end user request, Yuan-ying Technology has launched MX51 Android OS development platform and turn-key solution --- i.MX51W.

The i.MX51 processor is based on an ARM Cortex A8 as core architecture (with Trust Zone), CPU frequency is 800M~1Ghz, own 32 Kbyte L1 Instruction Cache and 32 Kbyte L1 Data Cache, also 256 Kbyte L2 Cache as well. Integrate Neon Coprocessor to enhance its Vector floating point operation ability. To boost multimedia performance, the following hardware accelerators are integrated: VPU – Video processing unit, IPU – Image processing unit, GPU 3D – Graphic Processing Unit (OpenGL ES 2.0 AMD Z430) and GPU 2D – Graphic Processing Unit (OpenVG1.1 AMD Z160). Support multiple format of HD720P video decode and multiple format of D1 video encode, also support 720P/1080i CVBS analog video signal output directly. Take advantage of DVFS (Dynamic Volt Frequency Scaling) and Smart Speed technology for smart power management, At the equal performance condition, which can run at the lower power consumption, and further reach great multimedia result.

i.MX51W is an WinCE Platform EVK based on WinCE6.0 kernel , and adopt ext2 file system, designed by Yuan-ying Technology. i.MX51L own plateful peripheral interface, such as



USB HOST, USB OTG, TVE Output, DVI, VGA, LVDS, TFT LCD, SDIO and so on, i.MX5A is widely applied various field, including: Consumer Electronic/Automotive Infotainment, industrial computer and industrial control. Which is the most suitable platform for tablet/Smart Book, Smartphone, MID, E-book, Digital Picture Frame, Home Media Terminal, V2IP, Car Multimedia, Industrial Computer, Factory Automation, HMI design. Customer can only focus on the application software design, and largely shorten the time to market cycle.

◆ **Hardware Brief**

CPU Processor

- ※ **i.MX51**
- ※ **ARM Cortex A8 800M~1GHz**
- ※ **32 Kbyte L1 Instruction Cache and 32 Kbyte L1 Data Cache 256K L-2 Cache**
- ※ **256 Kbyte L2 Cache**
- ※ **NEON Coprocessor for VFPU**
- ※ **Hardware Graphic Accelerator OpenGL ES 2.0 --- 3D**
- ※ **Hardware Graphic Accelerator OpenVG 1.1 – 2D**
- ※ **VPU/IPU for Video Procession Unit and Image Processing Unit**

Memory

- ※ **RAM: 512MB DDR2 (128MB X 4)**
- ※ **Nor Flash: 4MB SPI (For Boot)**
- ※ **NAND/Nor Flash**

Peripheral Interface

- ※ **USB Interface: HS USB OTG, up to 480 Mbps, Integrated USB Phy, HS USB Host**
- ※ **SD: Two SD card slot (one of it for system boot)**
- ※ **FEC: 10/100M Ethernet**
- ※ **UART: UART Connector for debug using**

A-V output

- ※ **LCD: 7" or 8" TFT LCD display interface**
- ※ **DVI: DVI 720P video output interface, also support VGA display connector**
- ※ **Audio-In: MIC-in /LINE-in**
- ※ **Audio-Out: Line out / Headphones**

Clock and Power Supply

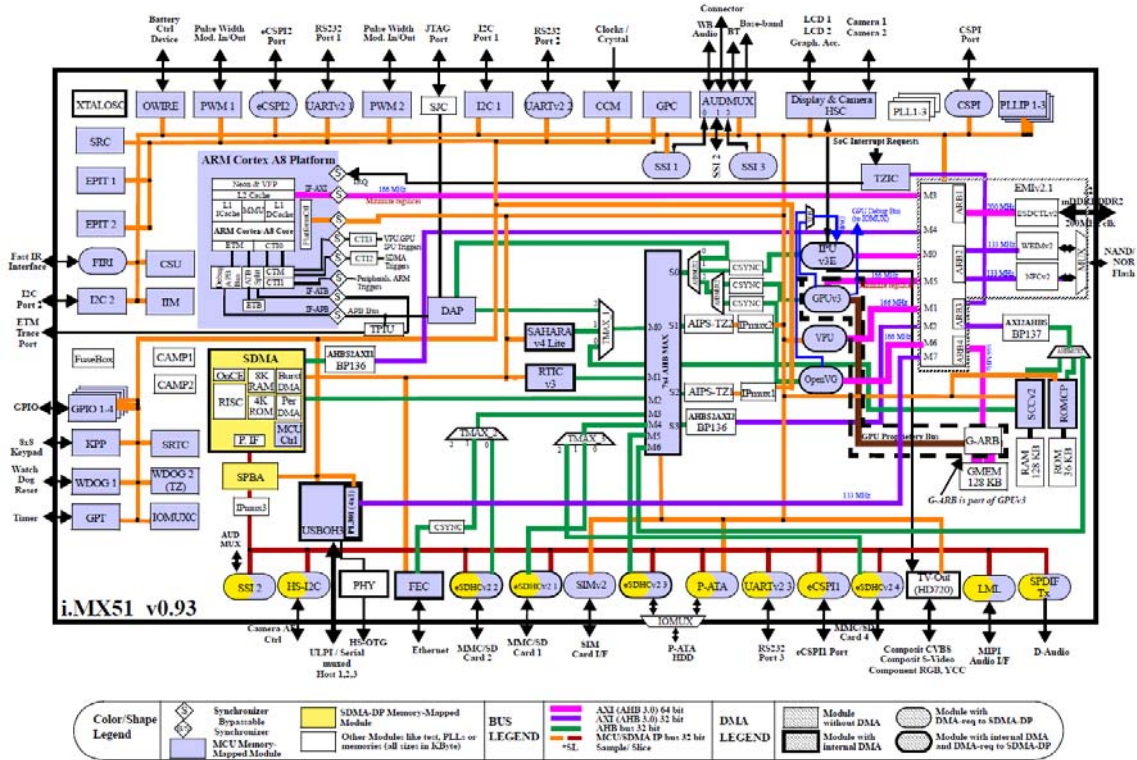
- ※ **RTC: External clock, real time clock supported**
- ※ **Power Supply: 5V, 2A output**



PCB Board Structure and Size

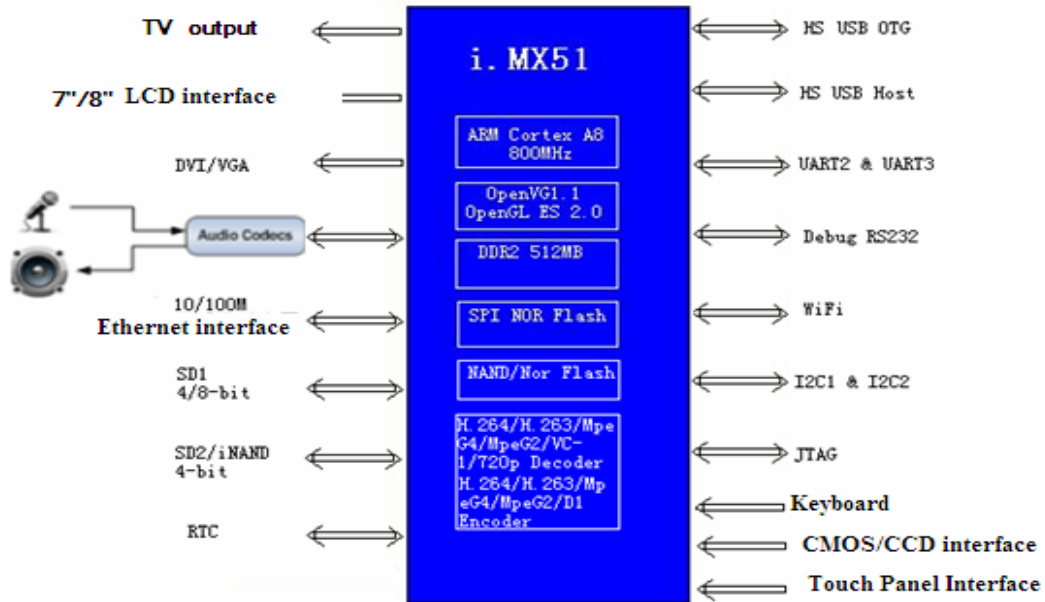
- ※ Bottom Board: 11cm x 12cm two layers PCB
- ※ Core System Board: 4cm x 6.5cm 6 layers PCB

◆ i.MX51 SOC Architecture





◆ System Block Diagram

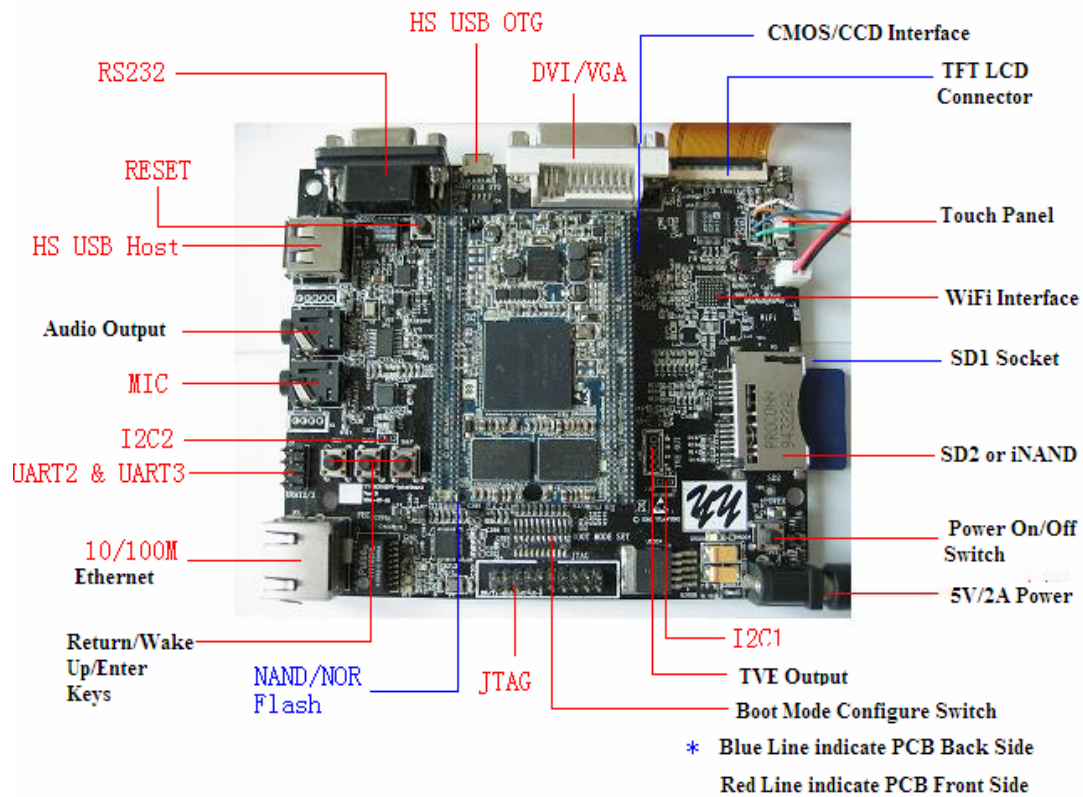


Note:

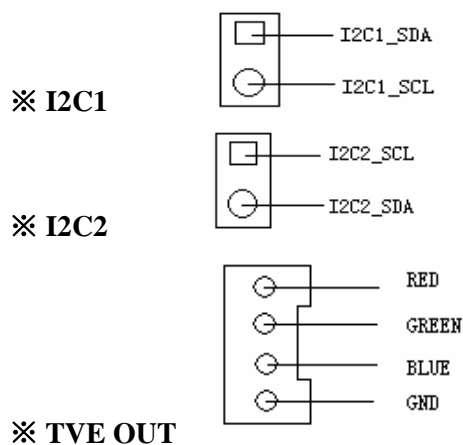
- Regarding TFT LCD, customer can select one of 7" and 8"
- WiFi is an option selection for customer selection
- Touch Panel: customer can select the resistance touch panel or capacitor touch panel
- One of SD1 or iNAND Flash is available



◆ Board External Connection:



◆ The related port definition:





◆ **BOOT mode selection:**

	Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7	Position 8	Position 9	Position 10
	BOOT_MODE[1:0]	BT_BUS_WIDTH	BT_MEM_TYPE[1:0]	BT_SRC[0]	BT_MEM_CTL[1:0]	LID_CLOSE_B	PWR_BYP			
SPI-NOR	0	0	1	1	1	0	1	1	X	X
MMC-1	0	0	0	0	0	0	1	1	X	X
MMC-2	0	0	0	0	0	1	1	1	X	X
UART-1	1	1	0	0	0	0	1	1	X	X
USB-OTG	1	1	0	0	0	0	1	1	X	X

◆ WinCE6.0 BSP overview

Bootloader	
Boot loader	First software loaded by hardware when system boots up. The Primary function for boot loader is to download, update images and load OS image from persistent storage memory. Note that Windows CE boot loader runs in kernel space.
NK.exe	
For Windows CE 6.0, OAL (OEM Adaptation Layer) is built as NK.exe . OAL is the layer which connects OS kernel and hardware. For Windows CE 6.0, OS kernel is built as kernel.dll.	
KITL.dll.exe	
KITL means Kernel Independent Transportation Layer. Windows CE Platform Builder can establish connection with target device by KITL. KITL is useful for debugging and remote tools provided by Platform Builder	
System Driver:	
Stream Interface Driver	<ul style="list-style-type: none"> ➤ Any device whose I/O operations are similar to the file I/O APIs ➤ Expose the stream interface functions ➤ Loaded by Device Manager at system boot time, device detection time,, or application load time ➤ See right table for stream interfaces
Native Device Drivers	<ul style="list-style-type: none"> ➤ Any interface other than steam interface ➤ Expose a custom API set that is unique to the driver ➤ Usually loaded by GWES at boot time ➤ Includes Display, Keyboard and Touch drivers
Kernel driver model	<ul style="list-style-type: none"> ➤ Kernel driver model is the default driver model ➤ Kernel model driver runs in kernel memory space ➤ Link to kernel version of coreDll, k.coreDll.dll ➤ High performance compared to user driver model ➤ Should be robust enough: driver crash could cause kernel corrupt ➤ Kernel model driver is loaded by device.exe
User driver model	<ul style="list-style-type: none"> ➤ Hosted by udevice.exe ➤ Close compatibility with kernel model drivers ➤ User model drivers lose kernel privileges <ul style="list-style-type: none"> ▪ No access to kernel structures or memory



	<ul style="list-style-type: none"> ▪ Cannot call certain kernel only APIs ▪ Restricted access to other kernel APIs <p>➤ Increases system stability</p>
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Multimedia Supporting:

Video Decoding	<ul style="list-style-type: none"> ● MPEG4 decode: 720p,30fps ● H.264 decode: 720,30fps ● H.263 decode: 720,30fps ● VC-1 decode: 720,30fps ● MPEG-2 decode: 720,30fps ● MJPEG decode: baseline, 30M pixels ● Divx decode: 720p,30fps ● RV10: 720p, 30fps
Video Encoder	<ul style="list-style-type: none"> ● MPEG-4 encode: D1,25/30fps ● H.263 encode: D1, 25/30fps ● H.264 encode: D1, 25/30fps ● MJPEG encode: baseline mode
Image Decoding	BMP Decode, GIF Decode, JPEG Decode, PNG Decode, JPEG Encode
Audio Encoding	MP3/WMA/SBC

※ **i.MX51 WinCE6.0 basic package**

-
- ① i.MX51 Linux EVK board, 1
 - ② 7" LCD, 1
 - ③ 4G SD card, 1/demo inside
 - ④ RS232 data line, 1
 - ⑤ USB data line, 1
 - ⑥ 5V 2A power supply, 1
 - ⑦ Document CD, 1
 - ⑧ Hardcopy for EVK brief, 1

※ **i.MX51 WinCE6.0 EVK Document list**

-
- ① i.MX51 data sheet, 1
 - ② EVK reference schematic (PDF, 1)
 - ③ EVK hardware manual, 1
 - ④ EVK Linux BSP user manual, 1
 - ⑤ i.MX51 Linux guideline, 1

